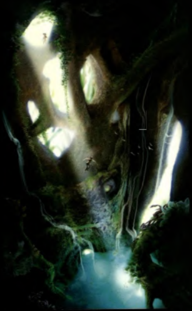
THE ART OF
DREAMWORKS THE CROODS

FOREWORD BY
NICOLAS CAGE

WRITTEN BY
NOELA HUESO

THE ART OF
DreamWorks
THE CROODS

The Croods goes back to the beginning, to a previously undiscovered era known as the Croodaceous period, a time when Mother Nature was still experimenting with a cavalcade of never before seen creatures – from the tiny, tusked Mousephant to the giant, multicolored Macawnivore, and more. Trying to survive are the Croods, a family led by father Grug, who must adapt after their cave home is destroyed and they set out on a journey through volatile and varied landscapes to find a new home.



The exciting original premise provided DreamWorks Animation's artists with almost limitless opportunities to explore variants of animal and plant life and locations. Full of humor, heart, adventure, and family dynamics, the movie also explores the theme of tradition versus innovation, as Grug's reliance on the ways of yesterday is challenged by an imaginative stranger's search for "Tomorrow".

With over 400 pieces of art, including storyboards, character designs, visual development, and effects concepts, and accompanied by exclusive commentary from the directors, producers, production designer, and crew, *The Art of The Croods* takes a vibrant and fascinating journey through DreamWorks Animation's making of the comedy-adventure movie.

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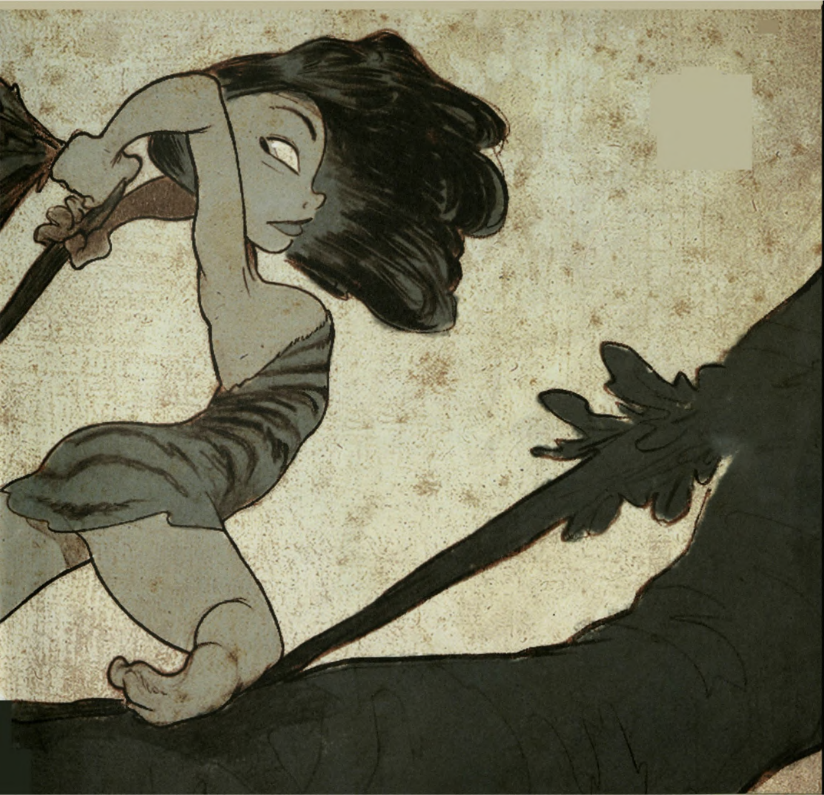

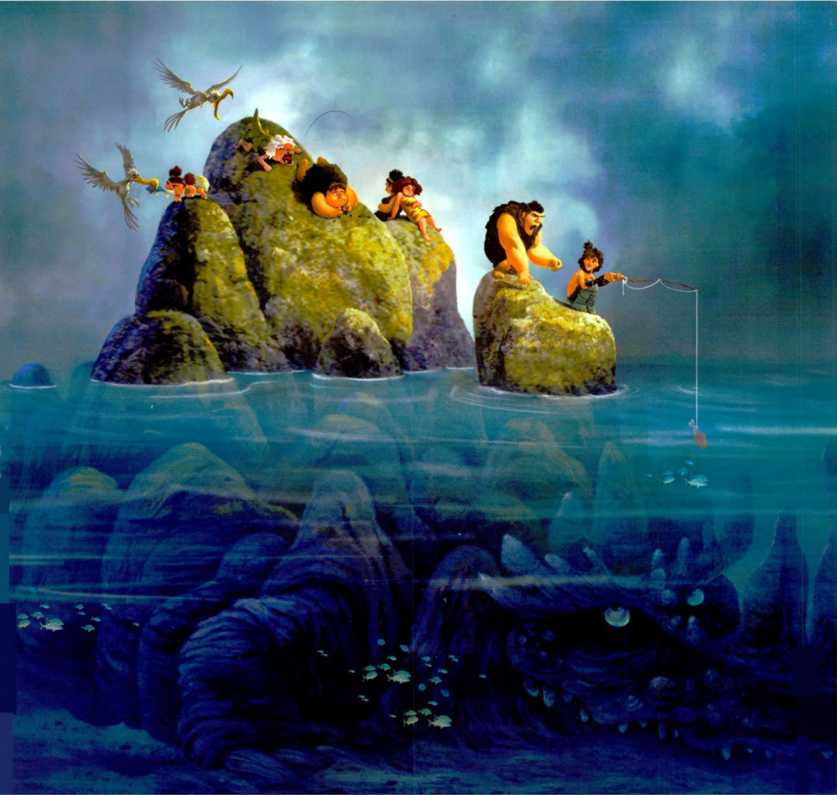

THE ART OF

DREAMWORKS

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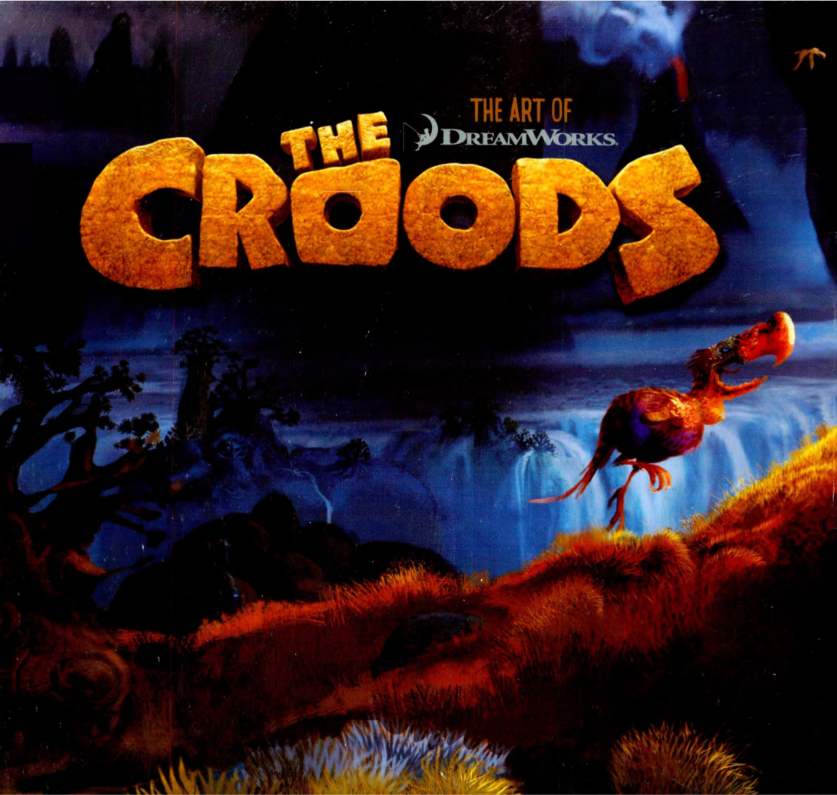

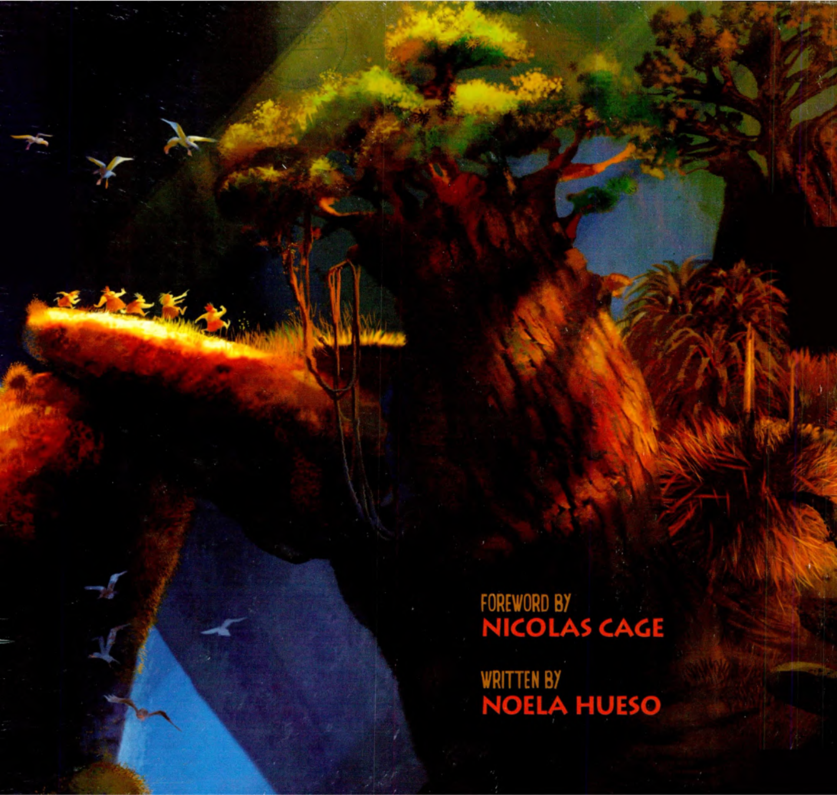

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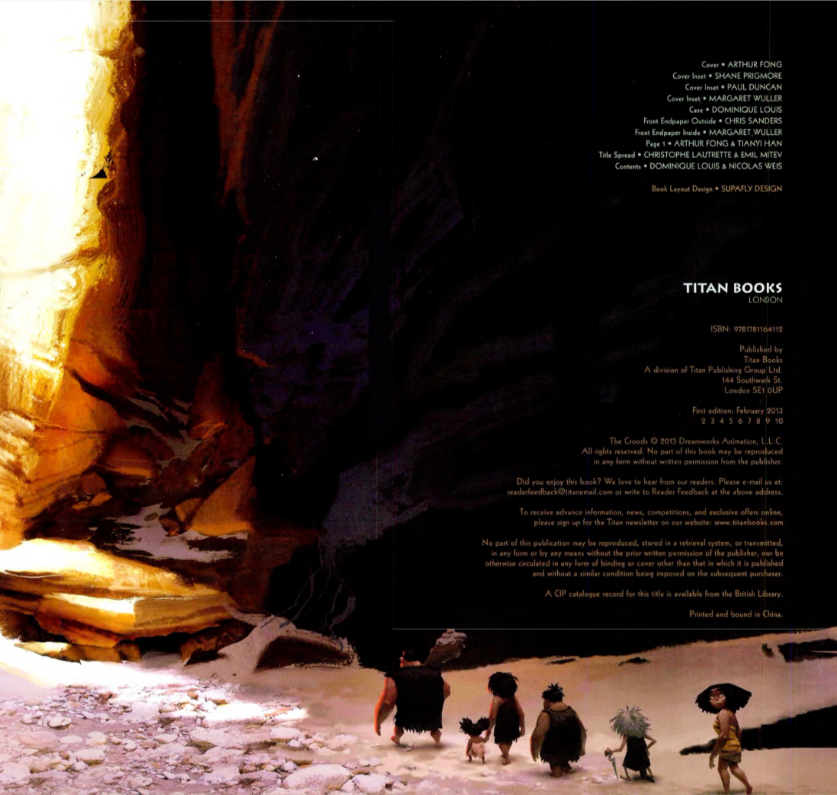

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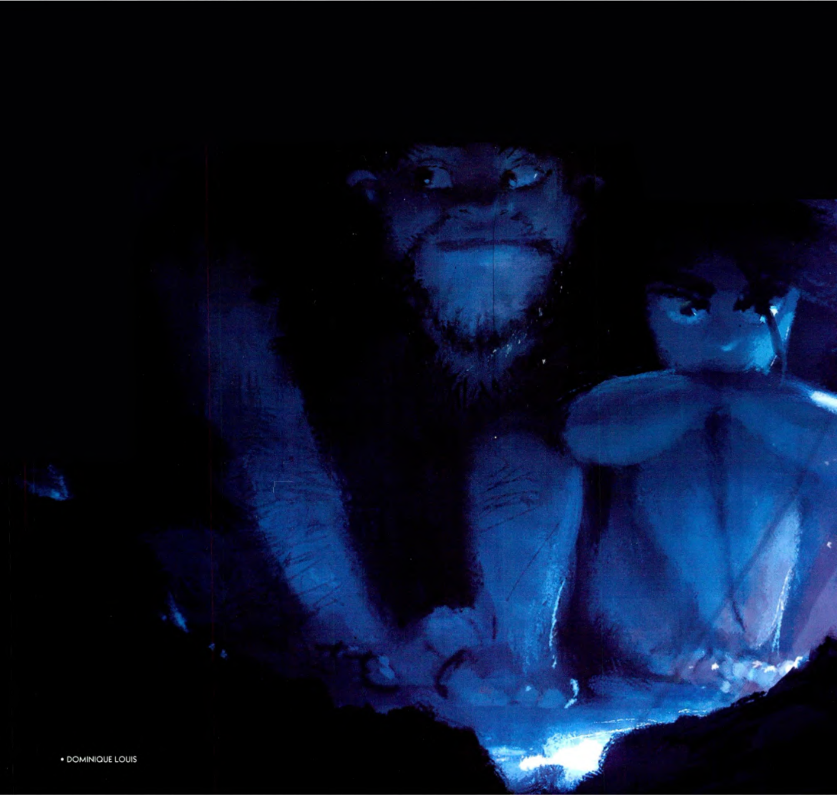


• DOMINIQUE LOUIS

FOREWORD

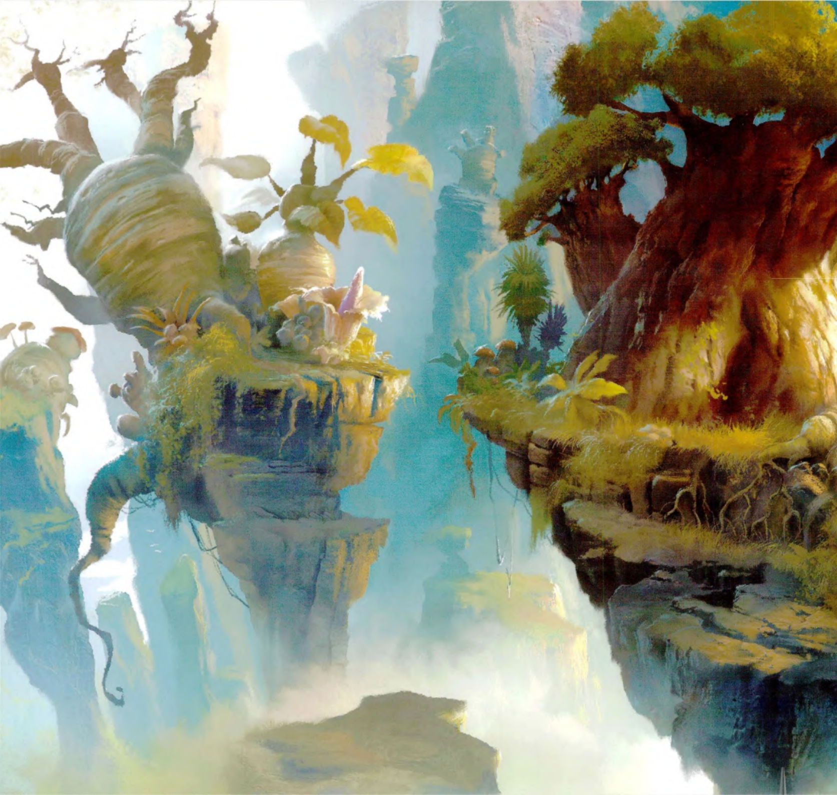
BY NICOLAS CAGE

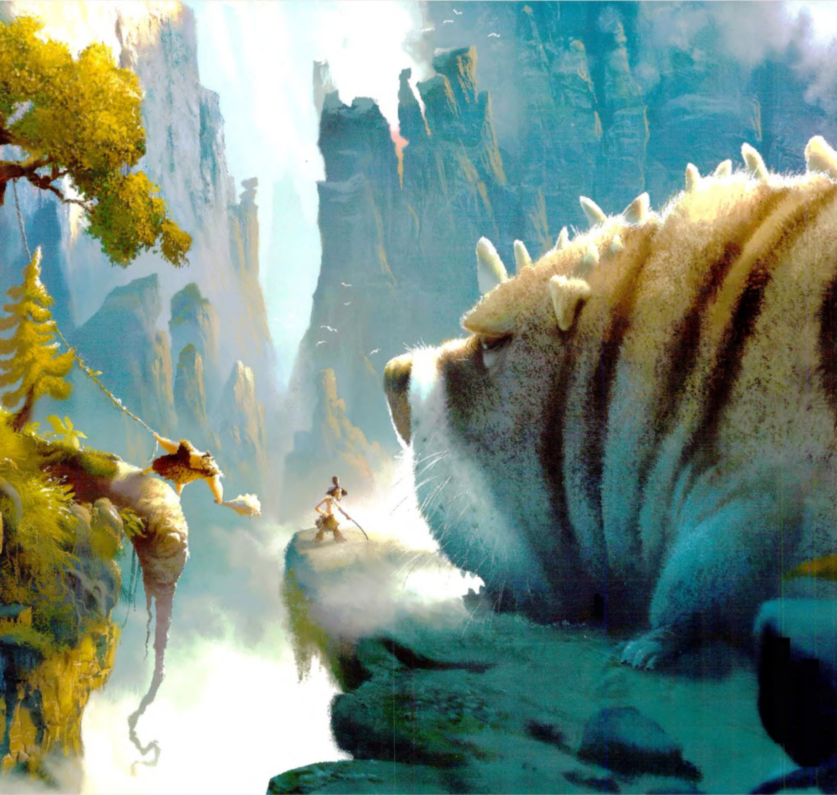
It is entirely fitting that my first meeting with the DreamWorks Animation team took place on an airplane...or maybe it was a prehistoric magic carpet. We met on an isolated tarmac outside of New Orleans, where they showed me the gorgeous, colorful, and wild art of *The Croods'* world as a vivid backdrop to explain the story of the overprotective father that is Grug. Then, they flew out as quickly as they'd flown in, narrowly beating an incoming storm and leaving me completely captivated.

Since then, the DreamWorks team and I have conceived Grug from truly international cultural influences. We first began discovering Grug amongst the oak trees in sleepy Somerset, England. We then grabbed further inspiration amidst the palm trees and mosquitos of the Caribbean. And finally, we worked while surrounded by the red rocks and caves of my own home, in the Martian-like landscape that is the Mojave Desert. In every location there was a genius loci – a genie of the place – that stimulated our exploration and imagination as we delved deeper into capturing this man and his story. It was instrumental to have these worldly inspirations as this is a movie about family...something the whole world cares deeply about.

It was a privilege to be a part of the DreamWorks process – reviewing animated sequences, volleying dialogue with directors Chris and Kirk, and absorbing the beautiful artwork that eventually turned into a magnificent movie.

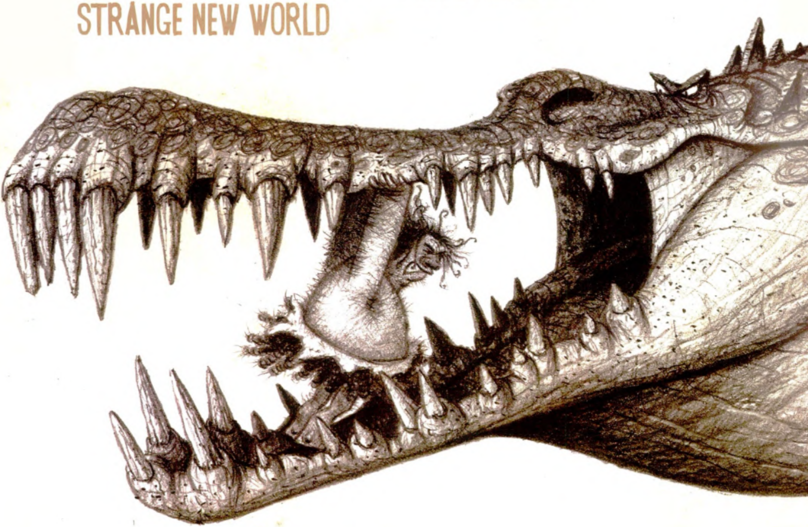
I know you will be equally inspired by the art in this book and you will be transported on your own magic carpet into the world of *The Croods.*





INTRODUCTION

STRANGE NEW WORLD



Pages 8-9: CHRISTOPHE LAUTRETTE & DOMINIQUE LOUIS

1 • SIMON VARELA 2 • TIMOTHY LAMB

What do you do when the only world you have ever known falls apart, quite literally, all around you?

It's a serious question that Grug, the caveman patriarch in DreamWorks Animation's *The Croods*, is confronted with when his family's ancestral cave is destroyed in a prehistoric earthquake. He's forced to take a leap of faith into the unknown, which is no easy task for a guy whose mantra is "never *not* be afraid."

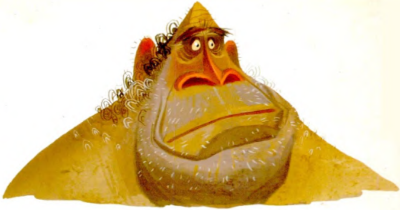
The fate of the Croods – steadfast wife Ugga, teenage daughter Eep, oversized nine-year-old son Thunk, feral toddler Sandy, and grizzled mother-in-law Gran – has always rested squarely on the broad shoulders of Grug. He is their zealous, overprotective defender against the elements and the aggressive predators that lurk in the Croodaceous, a previously undiscovered time between the Mesozoic and Paleozoic eras. The fact that they're the last caveman family standing says a lot about his adherence to the rules of survival written on the inside of their cave. As Eep puts it, "Anything new is bad, curiosity is bad, going out at night is bad. Basically, anything fun is bad."

But Eep isn't buying it. She's eager to set her sights beyond the dark, dank walls of her family's habitat. In fact, she's going a little stir crazy, which her play-it-safe father cannot understand. Except when they're hunting for food, they're always holed up inside, which is just fine with him.

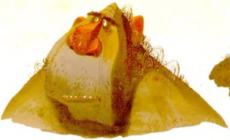
Eep escapes the confines of the crowded cloister one night and encounters Guy, a modern young man who wears shoes, has novel ideas, and carries a curious thing called fire. He's headed to high ground, a great gun barrel-shaped mountain off in the distance, to reach a place called Tomorrow because, as he warns an incredulous Eep, the world is about to end.

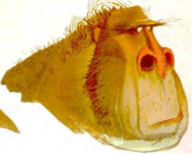
It certainly seems like it is. The very next morning, a tremblor brings giant boulders crashing down on the Croods' home, destroying it. When the dust settles, the Croods see a mysterious new land, lush with colorful vegetation, beyond the walls of the canyon where the cave once stood. Rising majestically on the horizon is Guy's mountain.

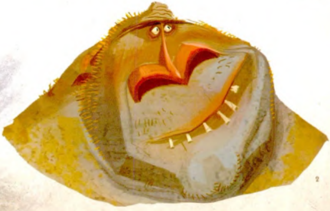
Stuck between a rock and a hard place, Grug is reluctantly compelled to lead his family on an expedition into this strange, unknown landscape to find another home. After a hilarious and sometimes hair-raising trek through the jungle (where they encounter bizarre-looking Mousephants, Punch Monkeys, Land Whales, and a hostile, multicolored Macawnivore) the value of Guy's fire torch becomes obvious when he suddenly reappears and uses his flame to divert a swarm of menacing Piranhakeets which were headed straight for the Croods.



> "WE BELIEVE THERE ARE CERTAIN THINGS AN AUDIENCE WILL EXPECT TO SEE IN A CAVEMAN FILM – THINGS WE WERE DETERMINED TO DELIVER, INCLUDING PHYSICALLY POWERFUL CAVEMEN WITH BEGINNERS' MINDS, BROAD ACTION, AND FIRE."
>
> – CHRIS SANDERS, DIRECTOR







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Convinced that danger is lurking at every turn, Grug insists that Guy and his fire travel with the family until they find a new place to live – even though the caveman is decidedly *not* a fan of the modern man and his newfangled ways. Guy, suddenly confined to a hollow log to prevent his escape, proposes a compromise: A trip to the mountain, which is certain to have caves. It's there where he will catch the sun and ride it to Tomorrow.

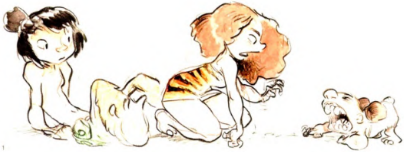
"The pilgrimage the Croods take is essentially the world's first road trip," says director Kirk DeMicco. "It's not just a physical journey, though," adds director Chris Sanders. "It's a metaphorical one, too, particularly for Grug, who learns along the way not to fear change and becomes a better man for it."

As the Croods travel from desert to jungle to tundra and beyond, intriguing landscapes of unimaginable beauty unfold before them. Despite the locations' fantastical aspects and the broad caricatures of the characters themselves, however, it was essential to DreamWorks Animation CEO Jeffrey Katzenberg and CCO Bill Damaschke that the *Croods* team created a world that was still believable. "Jeffrey and Bill really wanted us to push for developing environments that no one had seen before," says producer Kristine Belson, "but at the same time they wanted them to feel real – even if what we created were heightened versions of 'real.'" As Sanders puts it, "One of the biggest jobs of the film was honing down exactly what the look of this world would be. But we knew from the beginning that we wanted it to feel authentic." Producer Jane Hartwell adds, "It was really important to make the world almost a character itself." Crucial to achieving that result was the role lighting plays. "Not only does it set the mood and tone of the film," says Mark Edwards, head of lighting, "it helps drive home the story points and allows the audience to feel the characters' emotions through the world around them." Adds VFX supervisor Markus Manninen: "Lighting shapes the strong design of our film and describes the detailing by making the world 'friendly to the touch.' We wanted to believe this world and to make it a destination for the audience – or as Eep says, 'We should go there!'"

Through more than 400 images of original art, *The Art of The Croods* takes us there by revealing the visual voyage the filmmakers undertook – a creative collaboration that showcased the talents of many individuals, including those working in character design, character technical direction, VFX, lighting, surfacing, and animation.

"THE FEAR OF CHANGE IS UNIVERSALLY RELATABLE."

KIRK DEMICCO DIRECTOR



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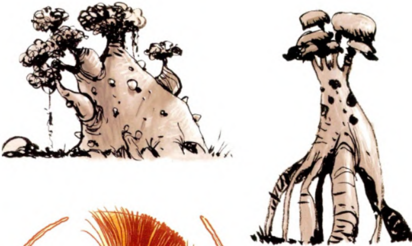

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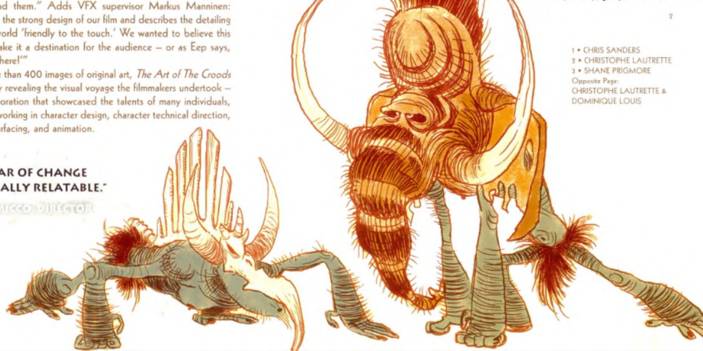

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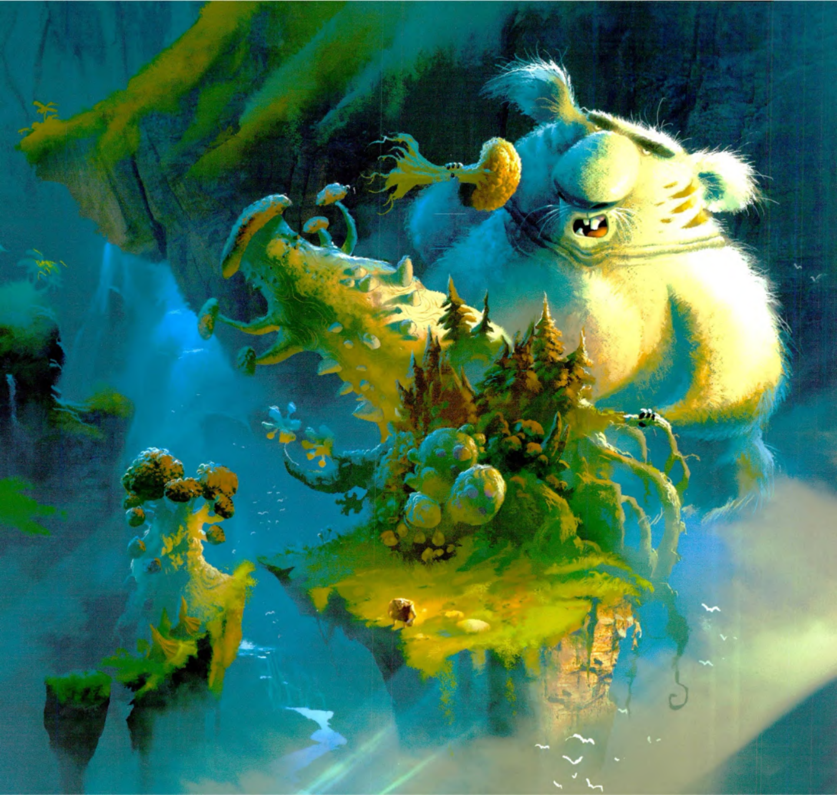
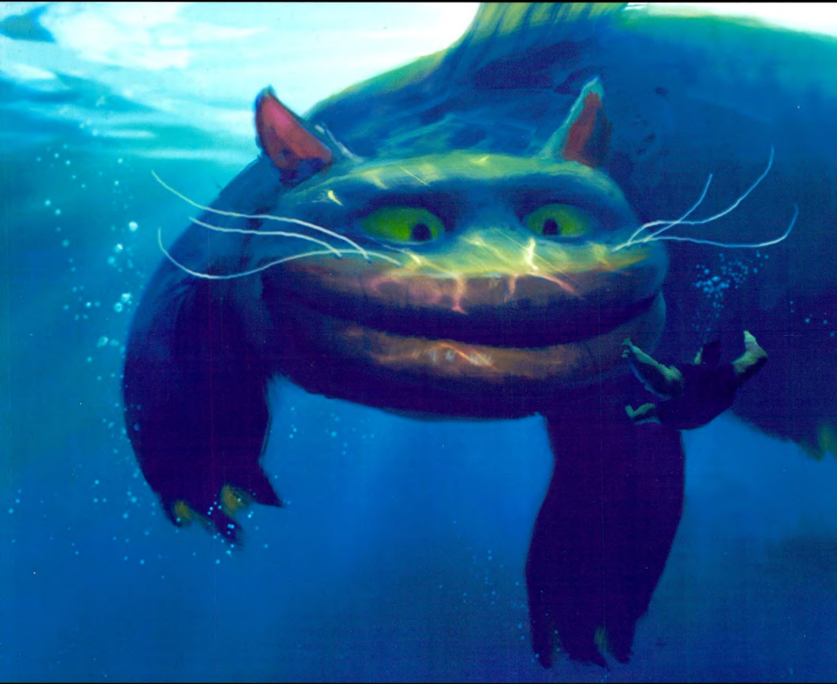
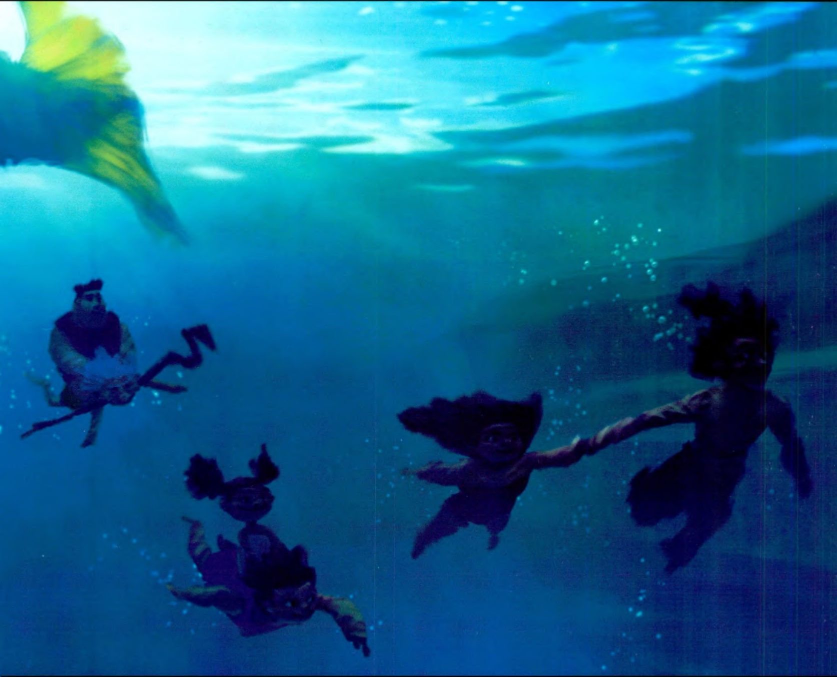
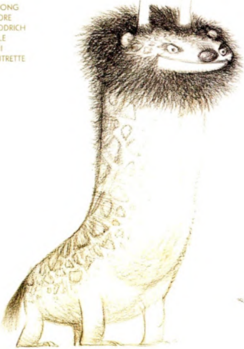
1 • CHRIS SANDERS
2 • CHRISTOPHE LAUTRETTE
3 • SHANE PRIGMORE
Opposite Page:
CHRISTOPHE LAUTRETTE & DOMINIQUE LOUIS







Pages 14-15: ARTHUR FONG
1, 5 • SHANE PRIGMORE
2, 3, 6 • CARTER GOODRICH
4 • SHANNON TINDLE
7 • TAKAO NOGUCHI
8 • CHRISTOPHE LAUTRETTE



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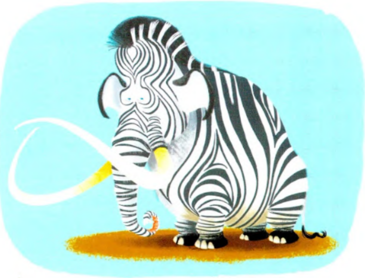

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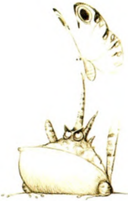

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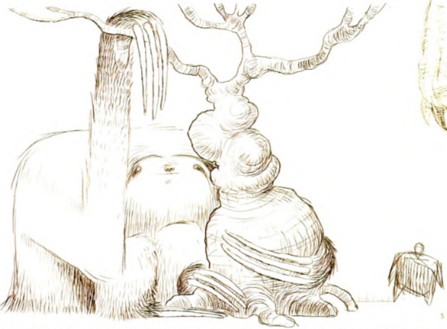

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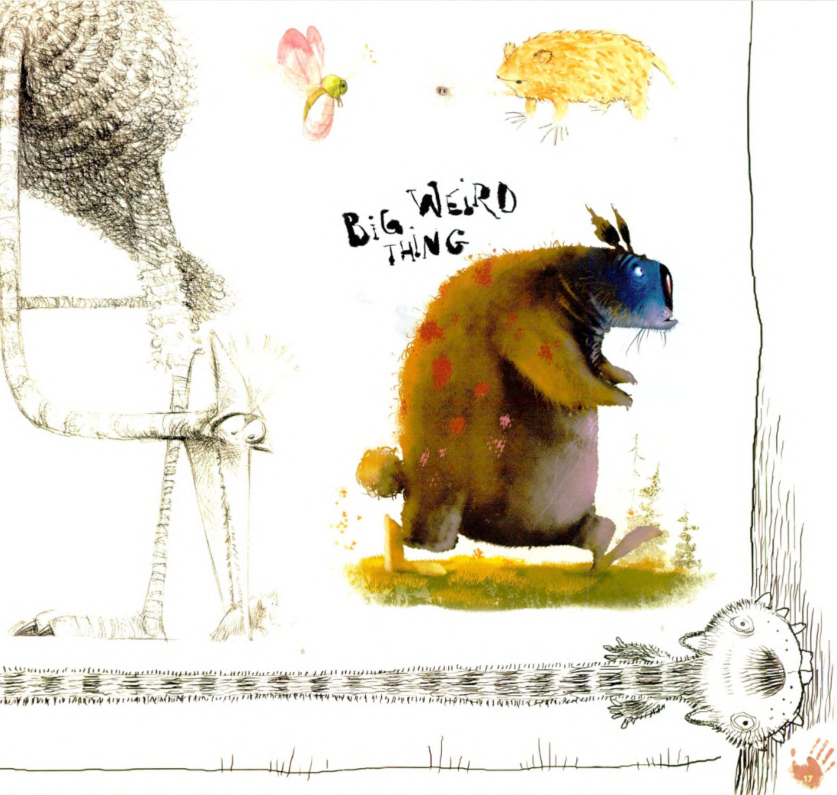
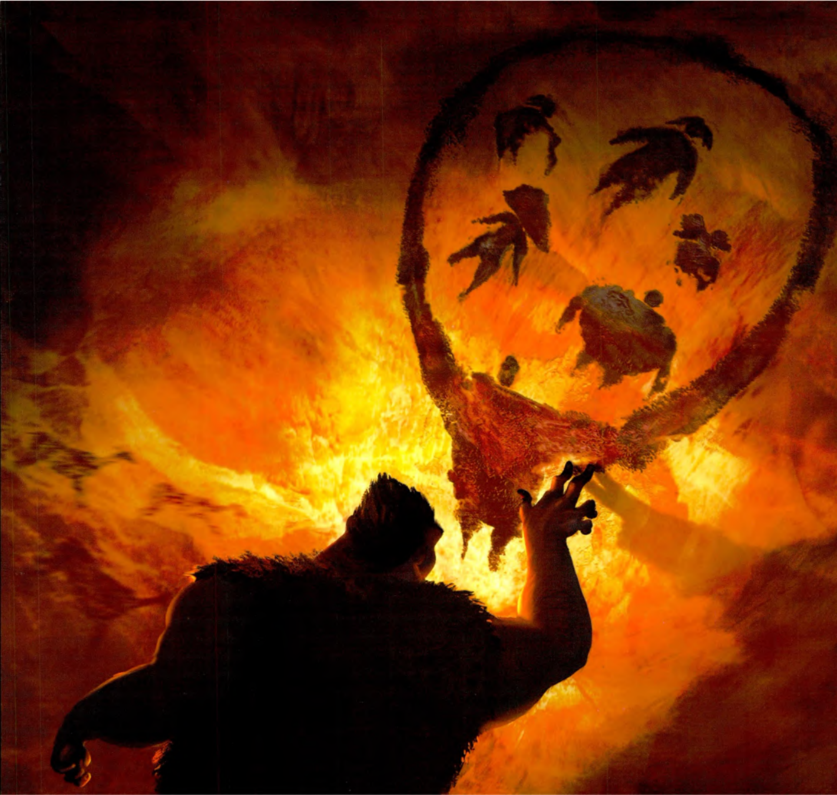
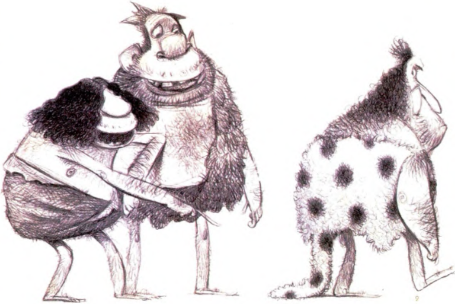

BIG WEIRD THING



FINDING THE CROODS

When writer-directors Chris Sanders and Kirk DeMicco and the rest of their filmmaking team got together more than five years ago to create *The Croods,* they were embarking on a journey that would take them to another world – right here on Earth. It would turn out to be as much an adventure for them as it was for the characters they created.

From the start, the production was anything but ordinary. For one thing, the entirety of it takes place in an organic setting. That alone called for a different mindset when coming up with a look for the film. The design of every mountain, tree, and flower in this made-up world would have to spring from the imaginations of the *Croods* team. A year-long halt in preproduction, when Sanders stepped away to direct DreamWorks Animation's *How to Train Your Dragon,* allowed DeMicco to re-envision the premise of the film, shifting from an emphasis on two quarreling members of a caveman tribe to an exploration of the last standing caveman family (a crucial change that ultimately propelled the production forward). The hiatus also gave production designer Christophe Lautrette and the art department some creative research and development (R&D) time, during which they explored, developed, and created a bevy of landscapes, characters, and creatures. By the time Sanders came back and preproduction officially resumed, a library of assets had been built from which he and DeMicco could choose to populate the film. In many instances, they tailored the story to fit the art; in others, environments moved to fit the evolving storyline; still others were created independent of the early paintings. "There was a constant flow back and forth with the directors," notes production manager Jed Schlanger.



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Pages 18-19: PAUL DUNCAN
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2, 5 • CARTER GOODRICH
3 • GRISELDA SASTRAWINATA
4 • CHRISTIAN SCHELLEWALD

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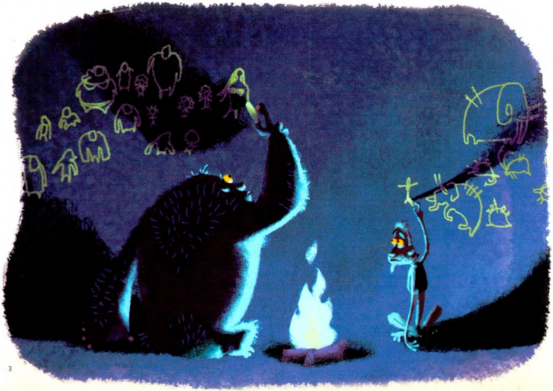
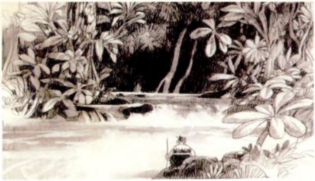
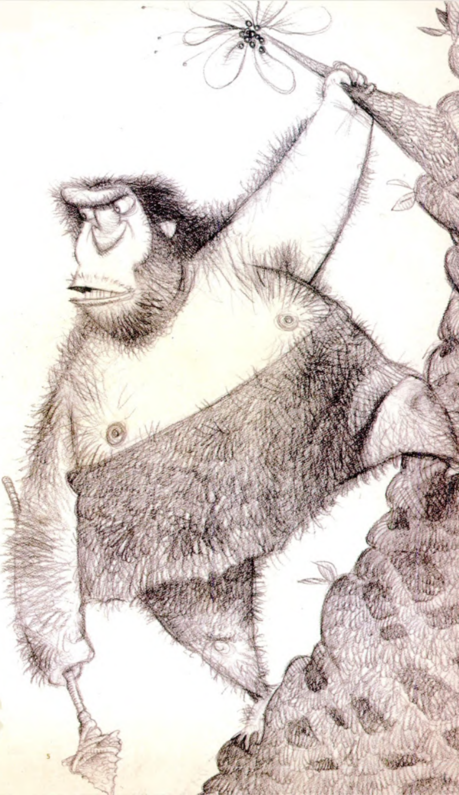




In other words, the traditional filmmaking workflow was turned on its head. Typically, storyboards dictate the direction of a film. The art department paints the scenes, and then gives approved artwork (chosen by the director, production designer, and VFX supervisor) to the modeling department so sets can be built. On *The Croods*, storyboards played a different role and it was the environments created by the art department – filled with the right detail and stylistic feel – that were given to modeling for inspiration as they created the sets. "We gave the modeling department flexibility when they were working on something that was pre-existing," says Lautrette. "We wanted to see what their interpretation of it would be." Essentially, they were given the green light to become co-creators of this world. "It was challenging and rewarding," says Jeff Hayes, head of modeling. "The modelers had to realize a set, often with nothing more than a single painting, and say, 'Okay, they've spelled out some elements, but what do I see when I look all around? What is the greater scope of this?'"

The intended grand scale of *The Croods* lent itself beautifully to a 3D format. From the start, head of layout Yong Duk Jhun says, the *Croods* team planned for audiences to have an "immersive experience" with the film. "There are no gratuitous 3D shots," he notes. "If a scene has an in-your-face 3D moment, it has to serve the story." To achieve total immersion, denser set dressing was created than usual – frames filled with layers of exotic plants and animals in foreground and background, for example – that allowed "audiences to believe they're engaged in a real-world experience, not trapped outside looking in from the screen," Jhun says, and because hand-held cameras were also employed to help create a you-are-there vibe, "we have more true realism in our camera work."

> "WHILE THE CHARACTERS AND ENVIRONMENTS HAVE VERY STYLIZED SHAPES, THEY'RE UNIFIED BY THE NATURALISTIC TEXTURES AND REALISTIC ANIMATION THEY SHARE – WHIMSICAL CREATIONS TREATED VERY SERIOUSLY."
>
> – KRISTINE BELSON, PRODUCER



1 • CARTER GOODRICH & TAKAO NOGUCHI
2 • SHANE PRIGMORE
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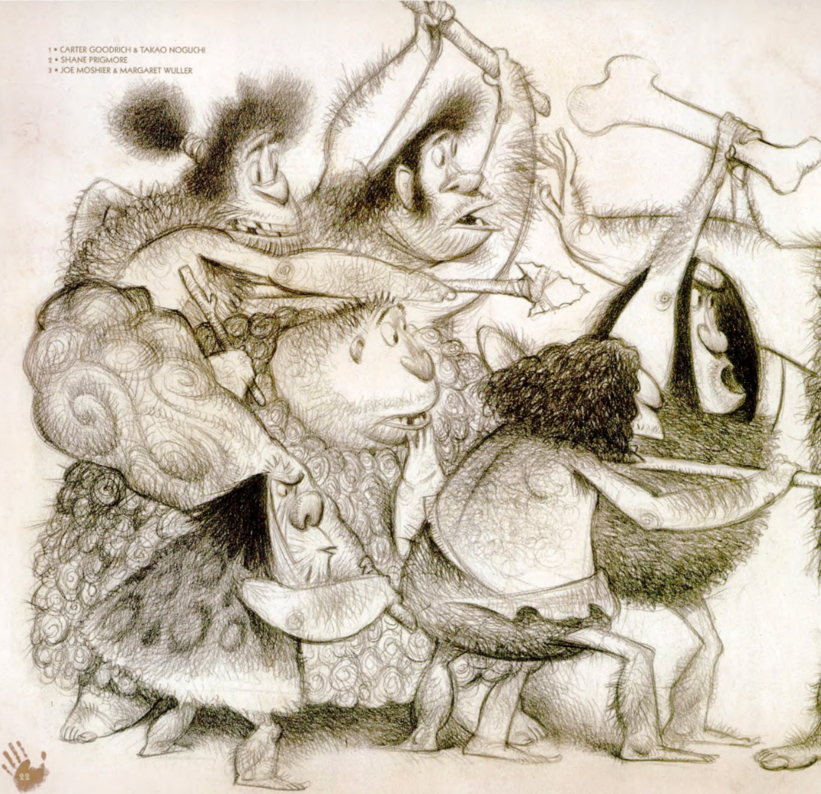

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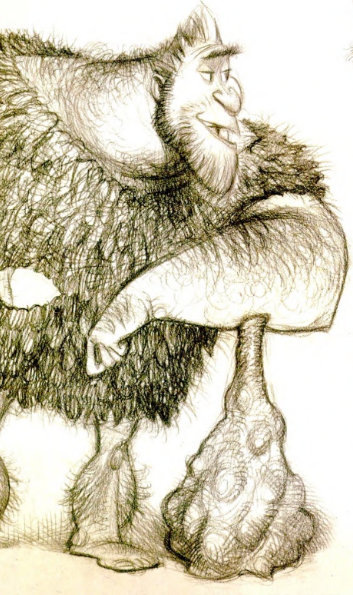
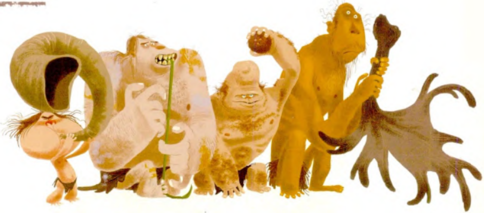
THE CHARACTERS





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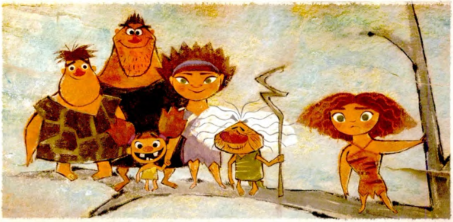
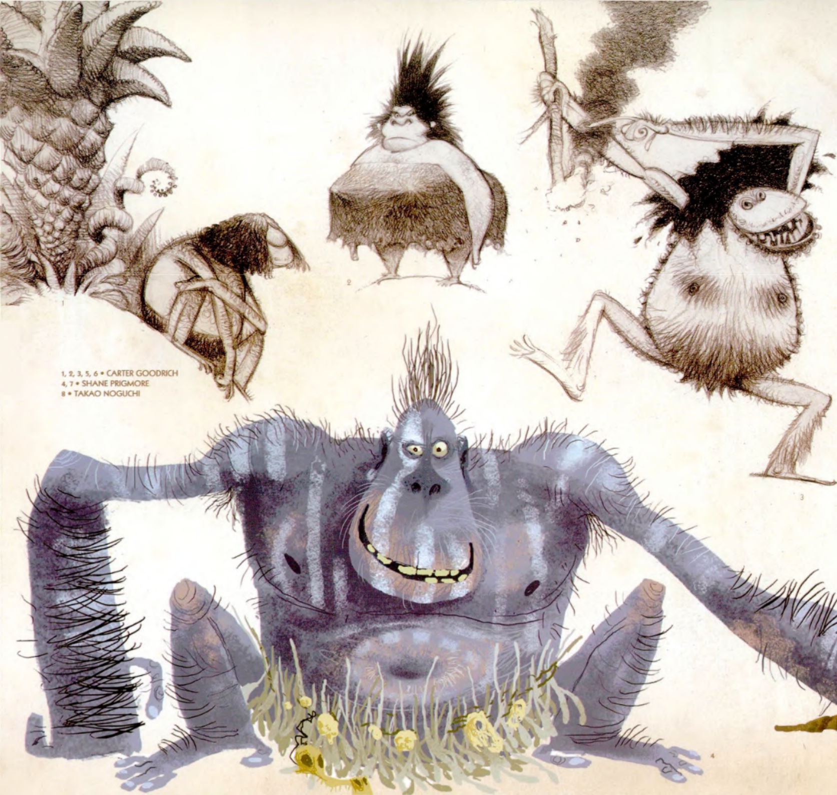
The Croods is a new spin on the caveman story and on cavemen themselves. In the early days of development, the filmmaking team knew almost immediately the qualities they intended their characters to have, even while the direction of their journey was still unfolding. "We had very strong ideas about what we wanted and didn't want them to be as cavemen," says producer Jane Hartwell. "We didn't want them to be modern; but we didn't want them to be the stereotypical slow cavemen either. We wanted them to go out there and be super powered. The directors wanted them to be human and fallible but they needed to be special in their strength. They needed to *not* be us." Director Chris Sanders agrees: "We wanted this family to be faster, stronger, and more resilient than we've ever seen" – no matter what their size or appearance.

3



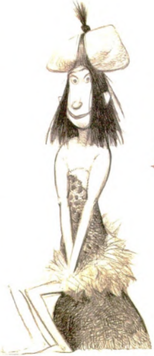


1, 2, 3, 5, 6 • CARTER GOODRICH
4, 7 • SHANE PRIGMORE
8 • TAKAO NOGUCHI

Early sketches by character designers Carter Goodrich and Shane Prigmore – drawings that depicted individuals that were alternately rough, tough, brute, and, in one instance, scrawny and goofy – gave the filmmakers a sense of what the characters could be. Some were immediate hits requiring only minor refinements, while others needed to be reimagined. The consensus was that, while they didn't have to be beautiful, they still had to be appealing in some way.

Goodrich, who had previously worked with character designer Takao Noguchi on a project for another studio, suggested that Noguchi join the *Croods* crew because of his talent for designing with 3D digital tools and his ability to infuse his drawings with particular appeal. Noguchi helped define the look of both the characters and other creatures to great effect. "Everything that Takao touched suddenly came alive," says director Kirk DeMicco. "There was something about the quality of what he did by modeling the characters in 3D that brought it home."

To differentiate one from another, each of the Croods and Guy had been given their own shapes – squares, triangles, circles, ovals, and pears. From a graphics standpoint, "You're trying to create a statement that is readily recognizable," says James Baxter, head of character animation. "When you're making a group movie, it's good to have silhouettes that are very distinct from a distance, too." Just as they each have their own shape, Guy and the Croods have specific ways of moving, most with animal-like grace and agility. Inspiration came from a variety of places. For Eep, who glides with the nimbleness of a cat, "We looked at a lot of parkour videos and watched how those guys move," says DeMicco. "If you're cruising and jumping over things, you're using your whole body. They're constantly putting their hands down. That was the kind of vibe we wanted."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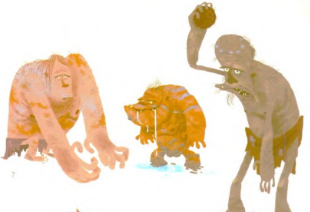
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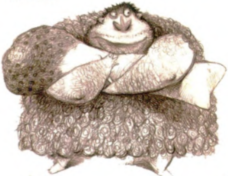
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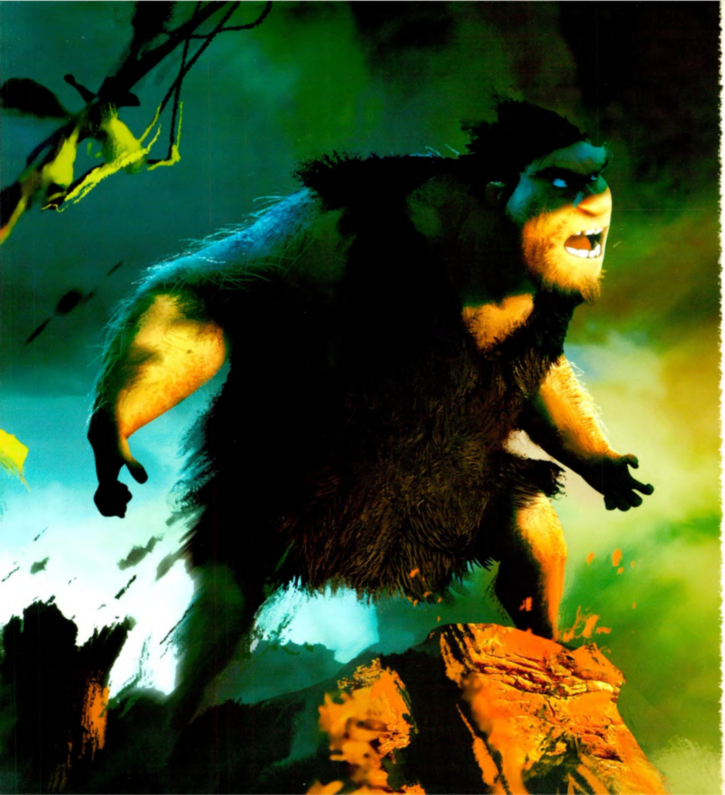

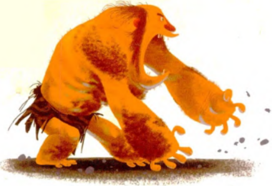

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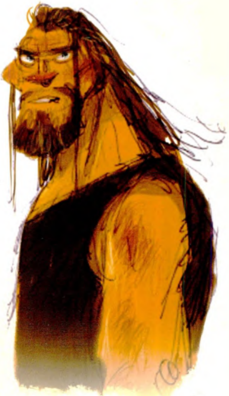
GRUG



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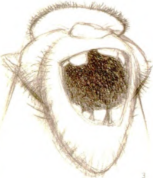

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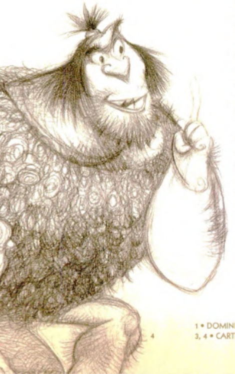
Very early in the story development process, Grug was the leader of a larger tribe, created by character designer Carter Goodrich. Though the storyline evolved to focus on just the Croods family, Grug survived and emerged as the family's protective patriarch. Even in those early days, Grug was pictured as "this giant block of a caveman," says James Baxter, head of character animation. "We envisioned this big, square body and football-shaped head, tapered at the hair line and chin. He has a huge neck that starts right underneath his ears. It's not long, but it's chunky." According to character designer Takao Noguchi, who took Goodrich's design and further refined it, "Grug's square shape represents toughness and power, both his position within the family and his responsibility for it. The size of his head indicates his brainpower – or lack thereof." Adds Baxter: "He symbolizes the old version of humanity – humanity 1.0, so he's more apelike in his proportions than the rest of the family. Even though the rest of the Croods do move around in a semi-apelike way, they're not consistent with that. If they have a flat open plain to walk on, they're just going to walk on two feet. It's only when they reach an obstacle they might put a hand down. They find it as easy to go vertical as they do horizontal."

"Grooming" Grug – and the rest of the Croods, for that matter – with all their inherent griminess, was a gratifying exercise for the surfacing department, charged with giving color and texture to objects and characters in the film. "When I started painting Grug, I had to make him dirtier – dirty nails and feet, dried skin, scabby elbows," notes Sabrina Riegel, head of surfacing. "That's not the norm. You usually want everything clean. From a painting standpoint, that was a lot of fun."



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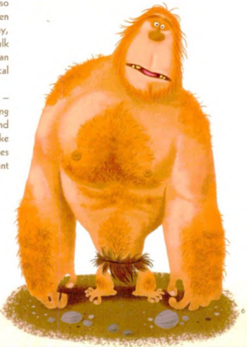

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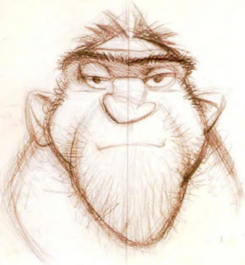
1 • DOMINIQUE LOUIS & TAKAO NOGUCHI 2 • SHANE PRIGMORE
3, 4 • CARTER GOODRICH 5 • CHRISTOPHE LAUTRETTE 6 • SHANNON TINDLE



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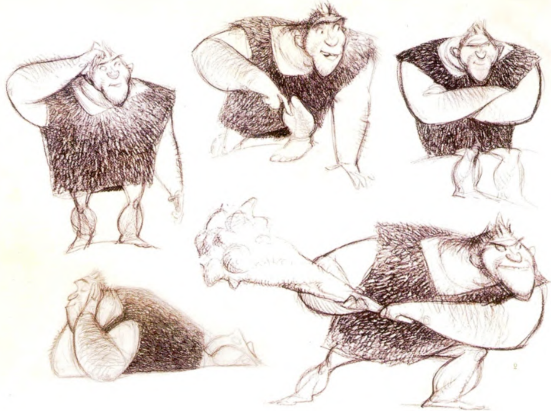

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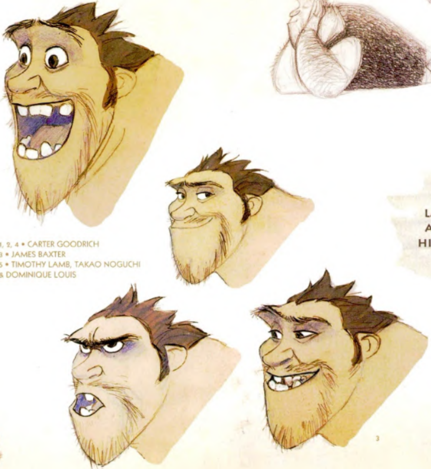

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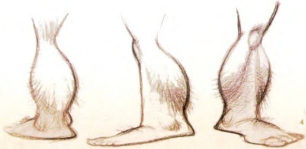
1, 2, 4 • CARTER GOODRICH
3 • JAMES BAXTER
5 • TIMOTHY LAMB, TAKAO NOGUCHI
& DOMINIQUE LOUIS

> "GRUG'S GOT GORILLA DNA ENGINEERED INTO HIS DESIGN, BUT ALSO INTO HIS LANGUAGE OF MOVEMENT. HIS PROPORTIONS ARE EXTREME – WHEN GRUG STANDS UPRIGHT HIS HANDS STILL ALMOST TOUCH THE GROUND."
>
> – CHRIS SANDERS, DIRECTOR



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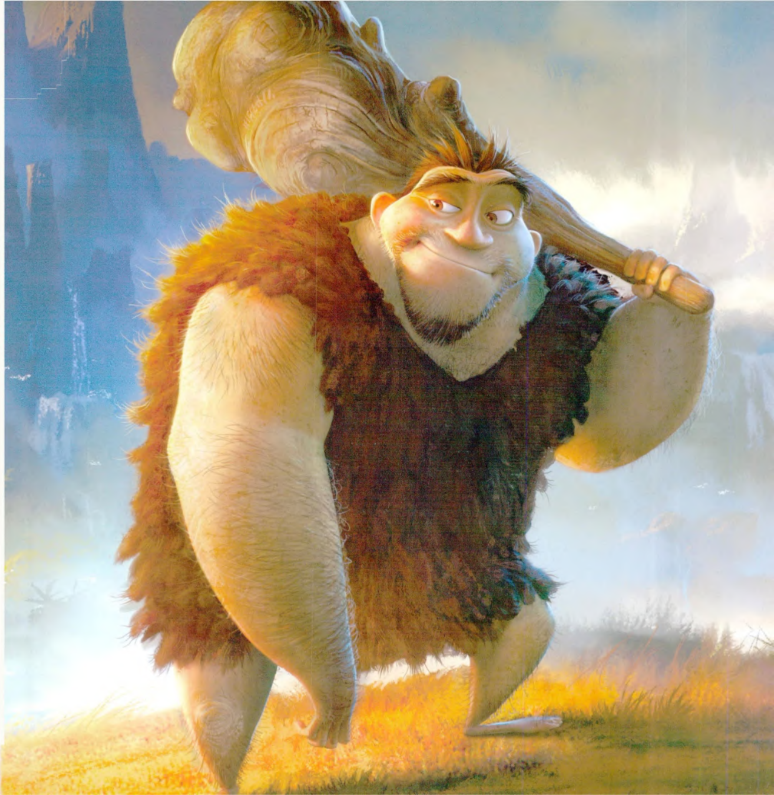

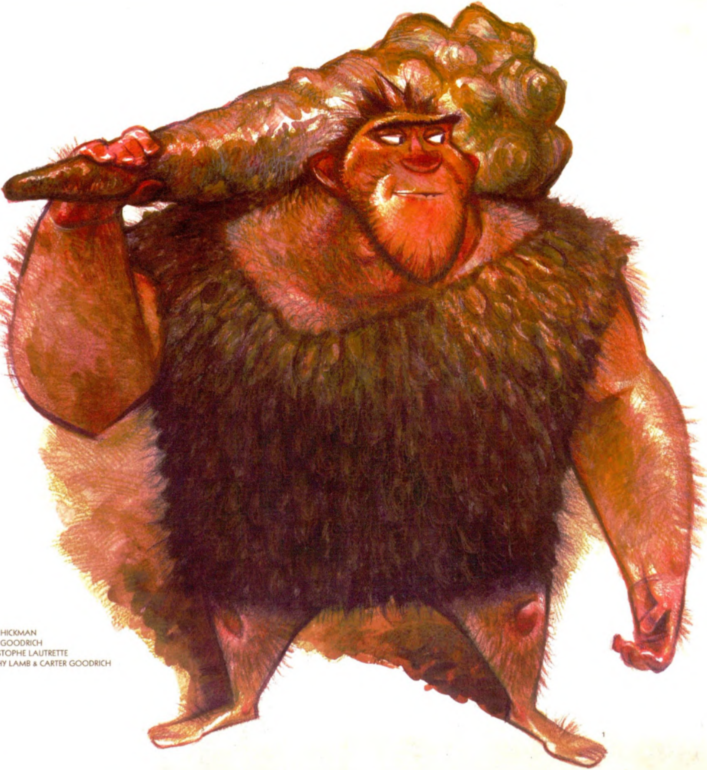

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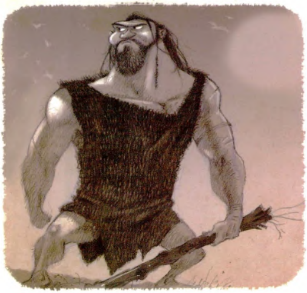
Page 30-31:
LEIGHTON HICKMAN
1 • CARTER GOODRICH
2, 3 • CHRISTOPHE LAUTRETTE
4 • TIMOTHY LAMB & CARTER GOODRICH



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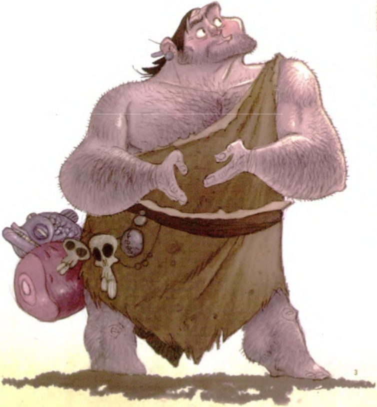

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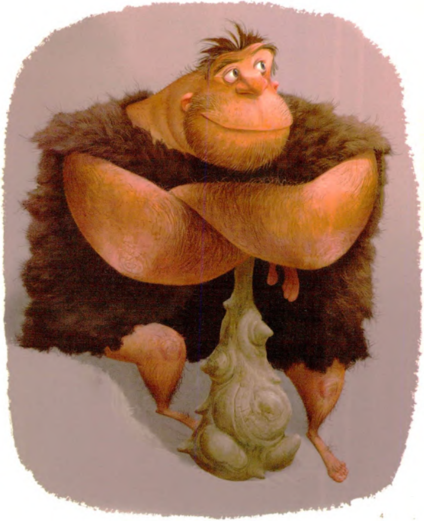

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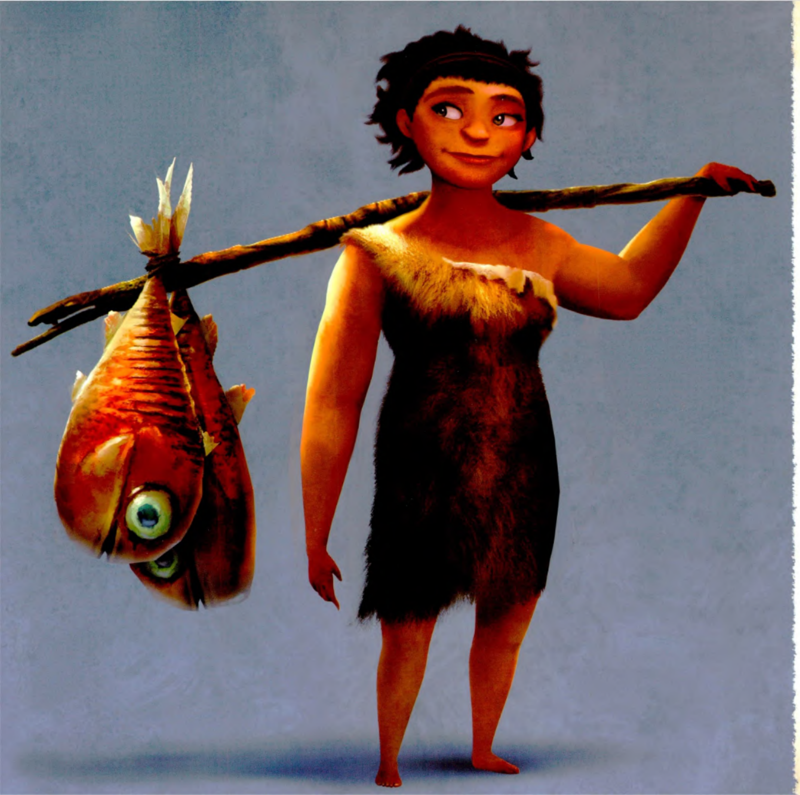

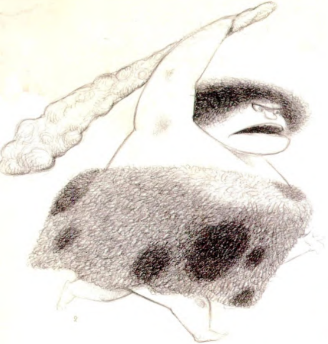

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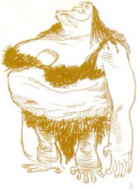

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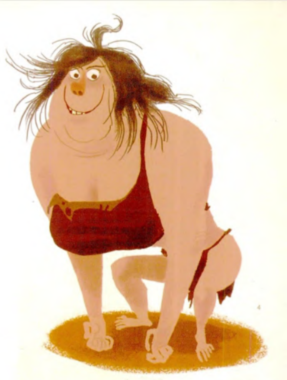

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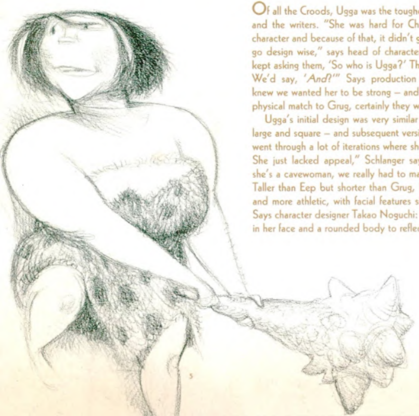
UGGA

Of all the Croods, Ugga was the toughest to realize, both for the artists and the writers. "She was hard for Chris and Kirk to pin down as a character and because of that, it didn't give us a very strong direction to go design wise," says head of character animation James Baxter. "We kept asking them, 'So who is Ugga?' They'd say, 'Oh, she's the mom.' We'd say, '*And?*'" Says production manager Jed Schlanger, "We knew we wanted her to be strong – and though she wasn't necessarily a physical match to Grug, certainly they were a team."

Ugga's initial design was very similar in shape to that of her mate – large and square – and subsequent versions weren't that different. "She went through a lot of iterations where she was huge, stocky, and strong. She just lacked appeal," Schlanger says. "We realized that although she's a cavewoman, we really had to make her look more presentable." Taller than Eep but shorter than Grug, Ugga became slimmer, prettier, and more athletic, with facial features similar to those of her daughter. Says character designer Takao Noguchi: "We gave her a spherical shape in her face and a rounded body to reflect her mild personality."



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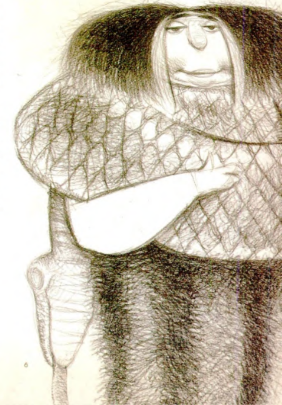

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1 • TAKAO NOGUCHI & DOMINIQUE LOUIS
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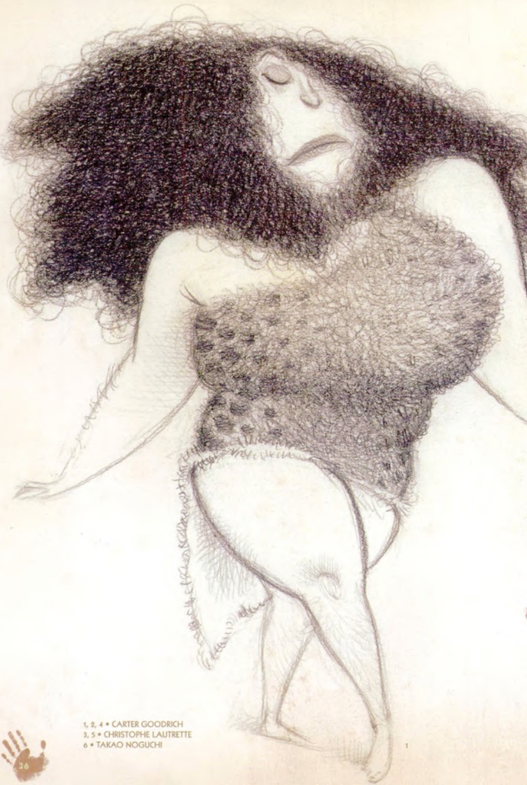
3, 4 • SHANE PRIGMORE



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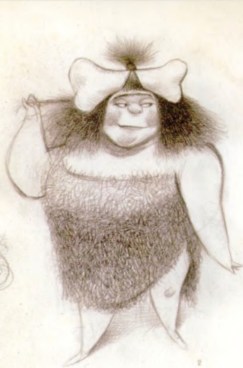

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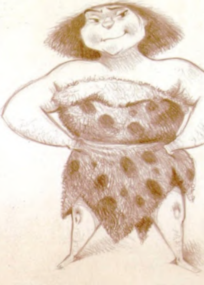

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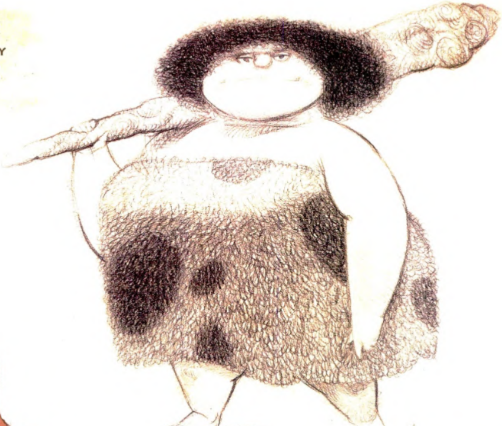
1, 2, 4 • CARTER GOODRICH
3, 5 • CHRISTOPHE LAUTRETTE
6 • TAKAO NOGUCHI

"FOR AN ARTIST, THERE'S NOTHING
BETTER THAN HAVING THE OPPORTUNITY
TO CREATE A WORLD THAT DOESN'T –
BUT COULD – EXIST."

– CHRISTOPHE LAUTRETTE
PRODUCTION DESIGNER



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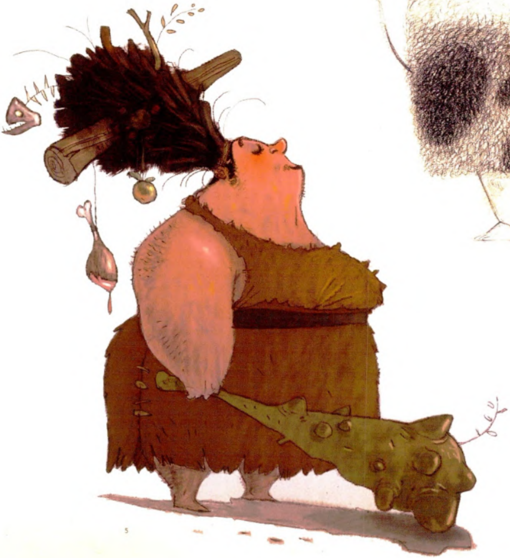

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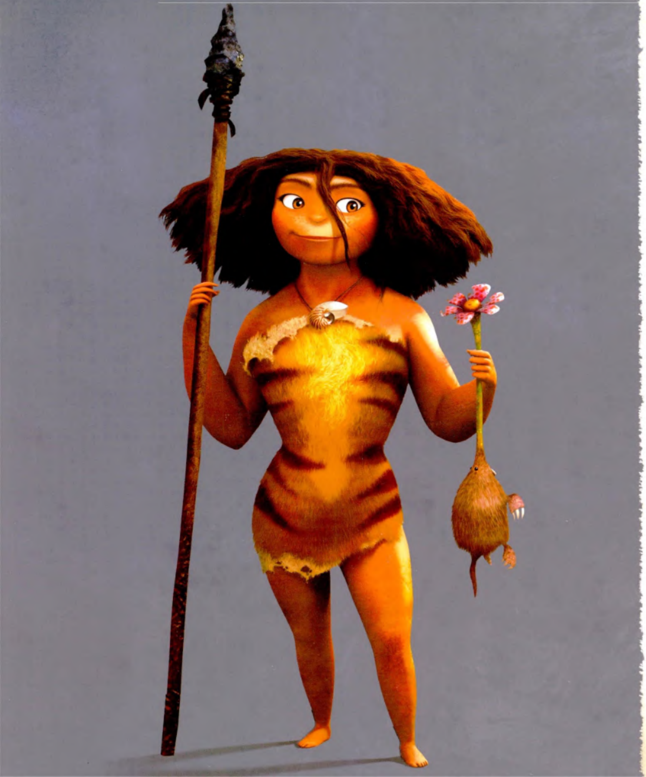

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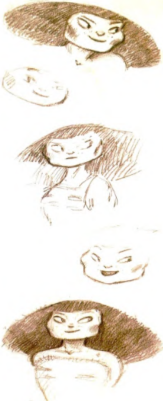

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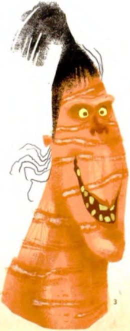

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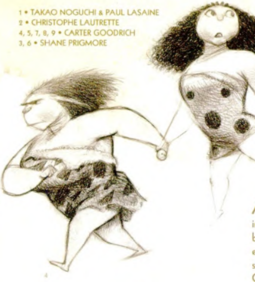
2 • CHRISTOPHE LAUTRETTE
4, 5, 7, 8, 9 • CARTER GOODRICH
3, 6 • SHANE PRIGMORE



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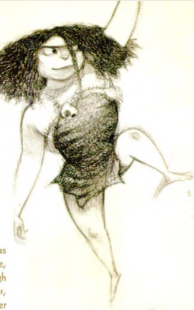
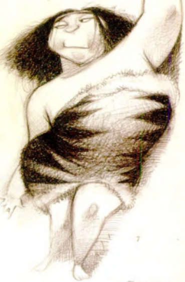
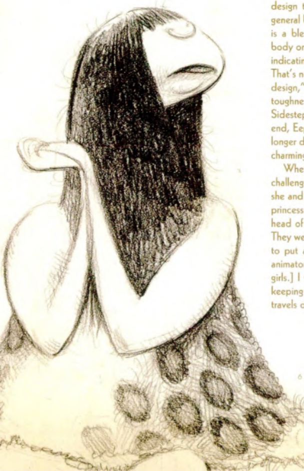
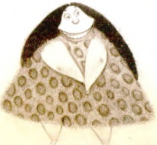


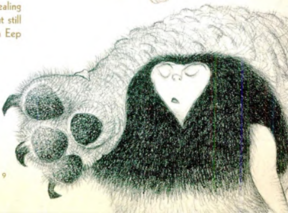
As a leading character and a love interest in *The Croods*, it was important for the art department to get Eep's look just right – feminine, but still strong and capable, befitting her caveman heritage. Though earlier incarnations of the teen were more extreme in their "clothing, hair, shape, proportions, attitude, and personality," says character designer Carter Goodrich, she's close to her original manifestation. "We had a design that Chris [Sanders] liked right away and we stayed with that general blueprint." Adds character designer Takao Noguchi: "Since Eep is a blend of both her parents, we gave her a wide, triangle-shaped body on top, which indicates that she's tough and athletic; a round face, indicating her softer, more feminine side; and diamond-shaped hair." That's not to say that she was easy to work on. "Her face was difficult to design," Noguchi says. "Carter and I tried to find that balance between toughness and appeal and had to avoid making her too beautiful." Sidestepping designs that were too apelike or too contemporary, in the end, Eep was given a short forehead and, in a nod to her background, a longer distance between her small nose and upper lip. To make her more charming, "We gave her bigger eyes and red cheeks," Noguchi adds.

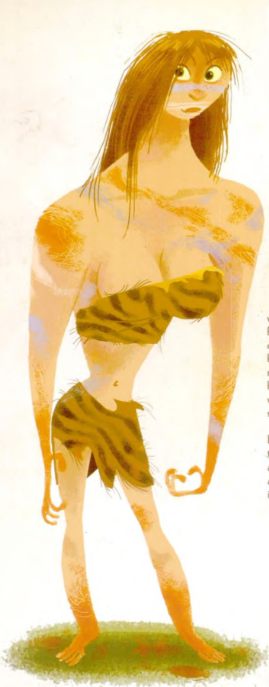
When it was the animators' turn to work on her, they had their own challenges. "She had to be appealing so that it was conceivable that she and Guy could have a connection – but we didn't want her to be a princess with a tiny waist and delicate little features," says James Baxter, head of character animation. "It was tough to get her proportions right. They were a bit stiff and she had a long torso and short legs. We decided to put a little Freddie Moore design into her. [Moore was a Disney animator in the 1930s and 1940s who specialized in drawing appealing girls.] I went over her proportions to give her a bit more grace but still keeping her upper-body strength" – which comes in handy when Eep travels over rocks or glides through fields with catlike agility.











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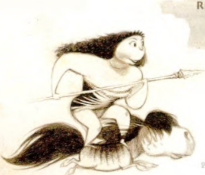
"WHEN EEP CLIMBS THE CLIFF WALL AND SEARCHES THE HORIZON FOR SOMETHING ELSE, SHE REACHES HER HAND UP AS THE SUN IS GOING DOWN, SO THAT SHE CAN "CATCH" ITS LAST RAYS...THIS IS A RECURRING MOTIF IN THE MOVIE, AND IT MOVES ME, BECAUSE IT'S SUCH A HOPEFUL GESTURE."

– KRISTINE BELSON, PRODUCER



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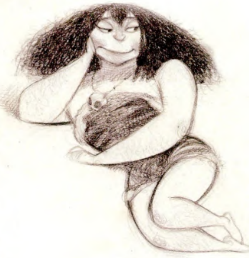

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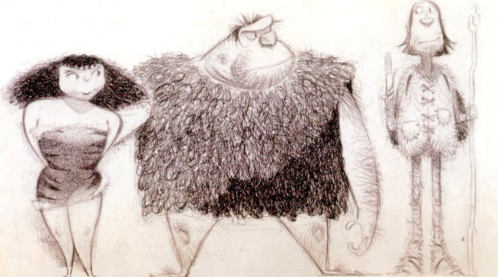
Eep's hair, too, was given particular attention. "Technically, her hair was really complicated," says Sabrina Riegel, head of surfacing. "At first, we didn't know what we wanted to do with it. We tried curls and different waves, but they just didn't have the right volume." Ultimately, it became a series of clumps and waves. Surfacing worked closely with the modeling department to determine how every contour would help make her silhouette more defined. "Once we got the overall shape working, we added subtle kink and curl controls to add more complex texture, but still maintained a softness," Riegel says.

Finally, a lot of time was also spent on "the geometry of her face" – Eep's mouth, teeth, and smile – as well as her tiger-skin dress. "Although the clothing on all the other Crood family members was to look dirty and a little worse for wear, we wanted to make sure she was still cute and appealing," Riegel says. "Her dress is worn, but we groomed the fur on it with subtle waves and kept the fur very soft."



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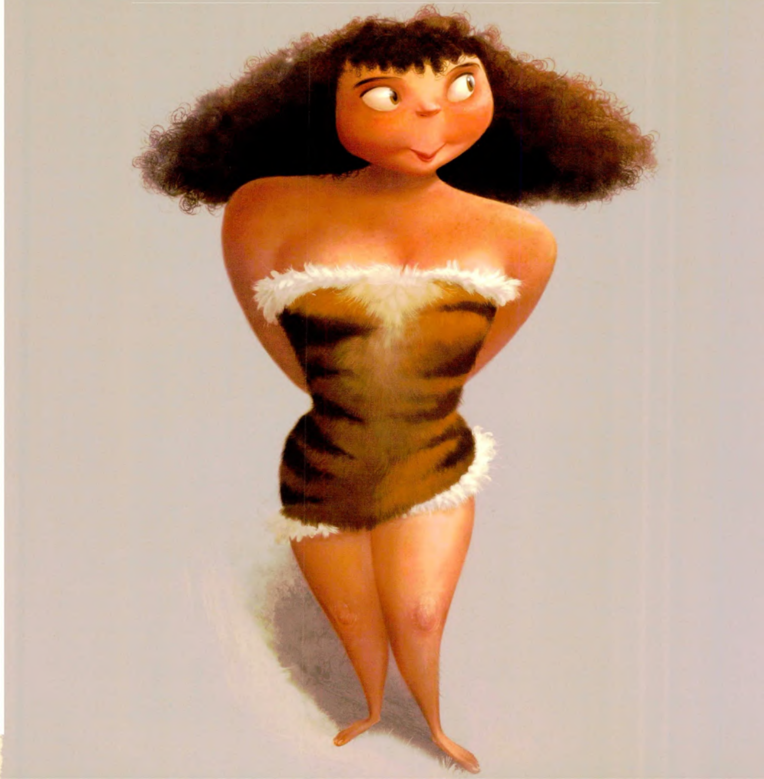
5 • CARTER GOODRICH & TIMOTHY LAMB



1 • TAKAO NOGUCHI & DOMINIQUE LOUIS
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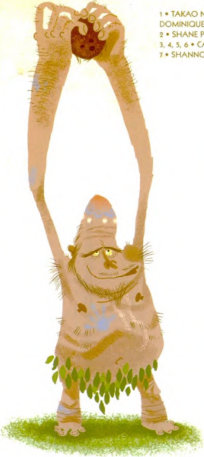
3, 4, 5, 6 • CARTER GOODRICH
7 • SHANNON TINDLE



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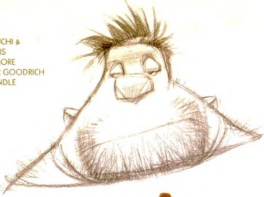

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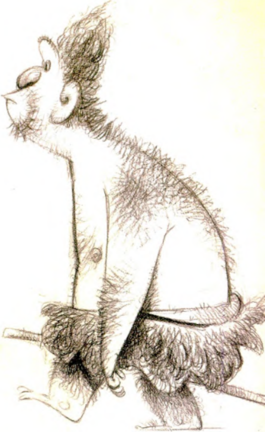
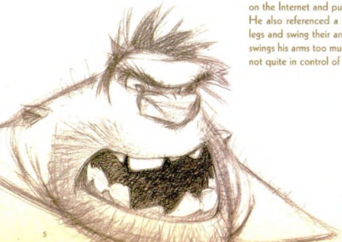


4

THUNK

Grug and Ugga's nine-year-old son Thunk is a chip off the old block. He wants nothing more than to be just like dear old dad, and by all appearances, he's already on his way. Like Grug, Thunk evolved from a character in the discarded tribe. He was the biggest and slowest member. As Grug's son, his frame took on a pear shape – "His body, his face, even his legs have that sense," character designer Takao Noguchi says – and the scale of his body was reduced. But not by much.

"Thunk was a joy to animate because he's this little kid but he's *huge*," says James Baxter, head of character animation. "Hans Dastrup, the animator driving Thunk's performance, has developed this great way of moving him around: He watched a lot of kids doing embarrassing stuff on the Internet and put that childlike awkwardness in Thunk's big body. He also referenced a lot of baby chimpanzees that run around on two legs and swing their arms too much. So, of course, when Thunk runs, he swings his arms too much. His wrists are very floppy when he walks. He's not quite in control of his young body."



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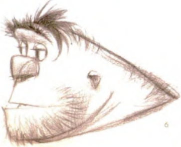

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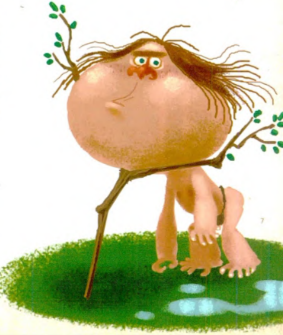

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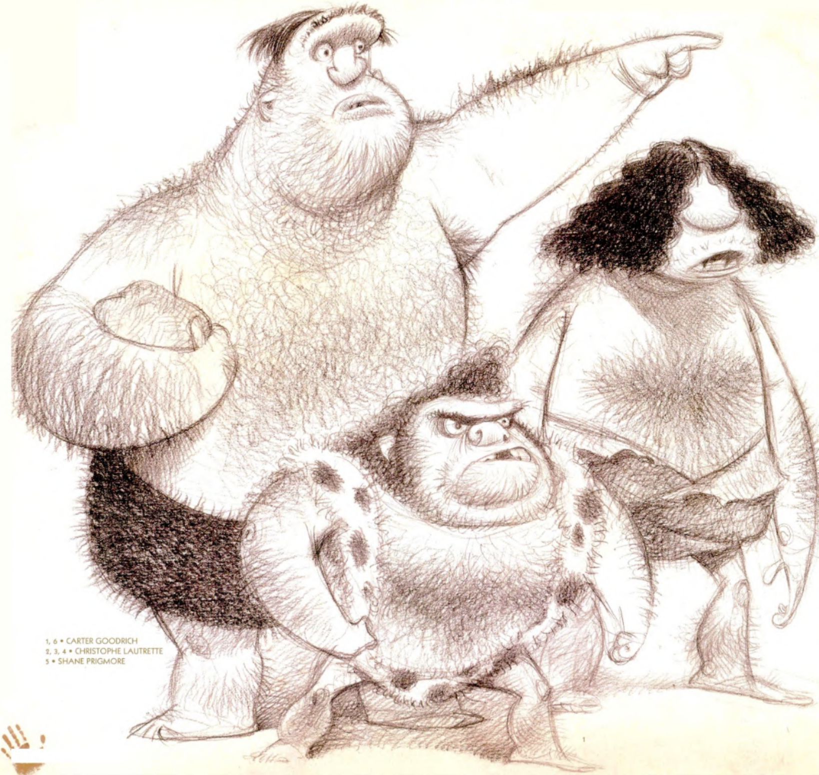
1, 6 • CARTER GOODRICH
2, 3, 4 • CHRISTOPHE LAUTRETTE
5 • SHANE PRIGMORE



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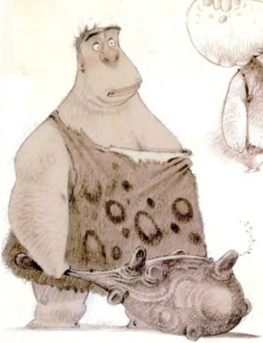

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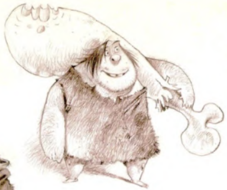

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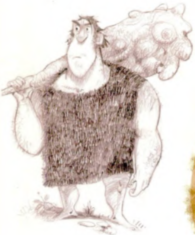
"THUNK WAS A JOY TO ANIMATE BECAUSE HE'S THIS LITTLE KID BUT HE'S HUGE."
– JAMES BAXTER,
HEAD OF ANIMATION



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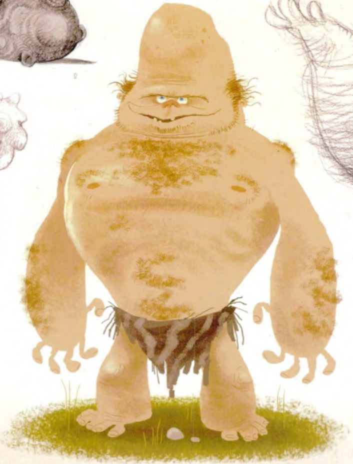

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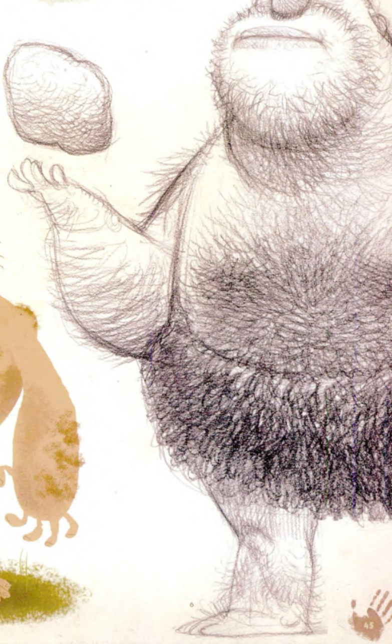

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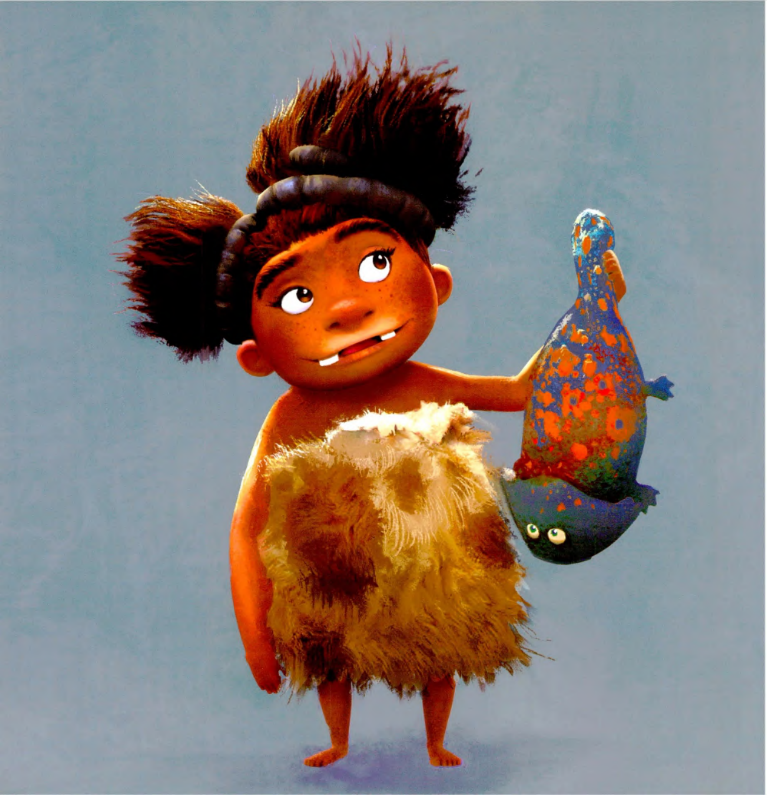

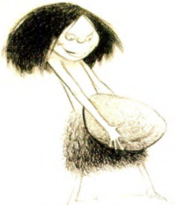
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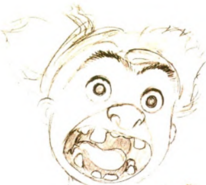
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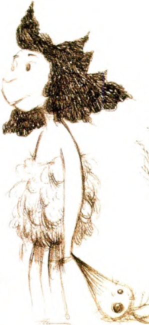
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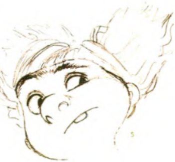
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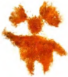
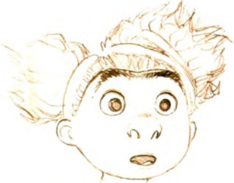


SANDY

"I had fun creating Sandy," character designer Takao Noguchi says of the youngest Crood, a biting, snarling whirlwind who doesn't speak but still gets her point across unmistakably. "When I began designing her, I didn't know what she would be doing in the story, so I just came up with my own ideas."

Envisioning her as a fearless kid and referencing some videos of baby bears climbing on their mothers' backs, Noguchi drew her like a cub, with a round face and two round pony-tails on her head, which, in silhouette, give the suggestion of ears. "Then I put two giant teeth on her as fangs," Noguchi says, which she uses to great effect throughout the film.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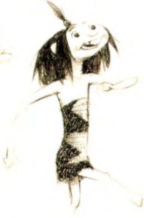
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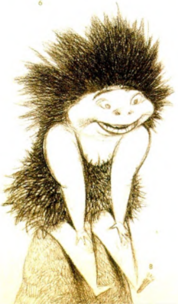
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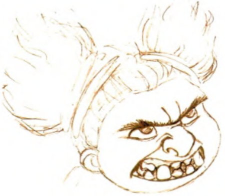
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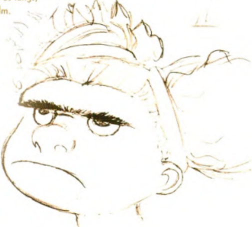
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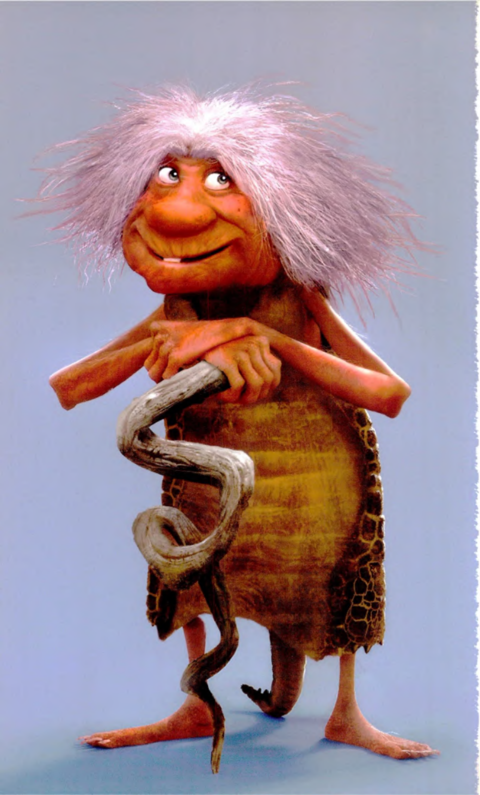


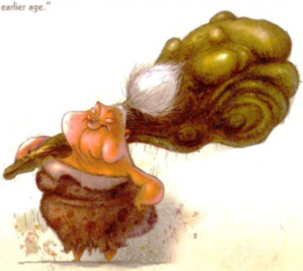
GRAN

Gran is old as dirt – the rumor is she's forty-five! She gets her thrills by badmouthing her son-in-law Grug and taking the occasional bite out of her grandson Thunk. In creating her, character designer Carter Goodrich says he realized that "Grannies are usually pretty limited as far as where you can go with the design. They're not likely to be anything but short in stature, wrinkled, and somewhat emaciated or wiry. Especially if they live the hard life of a caveman."

The native peoples that live in the Himalayan Mountains served as inspiration. "They're constantly in the sun, which influences the color and quality of their skin," says production designer Christophe Lautrette. "We decided that Gran's design and skin texture would be patterned after them."

Not surprisingly, she has a skinny body, a strong, wide jaw (which suggests that she eats a lot), and bigger hands and feet than the rest of the family. She also carries a stick. But don't be fooled: Gran doesn't need it to walk around. She uses it for hunting and fighting.

Her final look in the film didn't change much from Goodrich's original sketches. Character designer Takao Noguchi's digital renderings just served to further refine her. "I gave her an older-generation feel by giving her a dress made out of reptile leather," Noguchi says. "It has a tail, too, indicating that she's a more primitive human who has survived from an earlier age."



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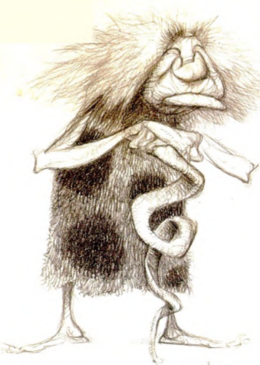

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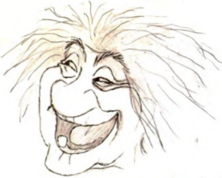

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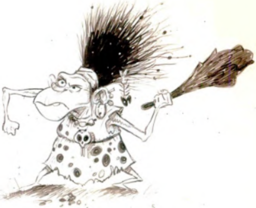

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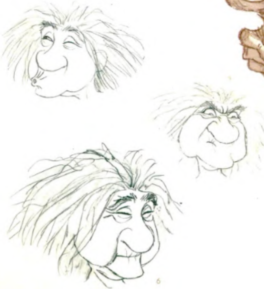

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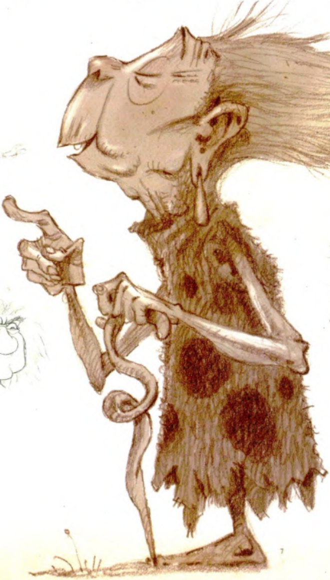

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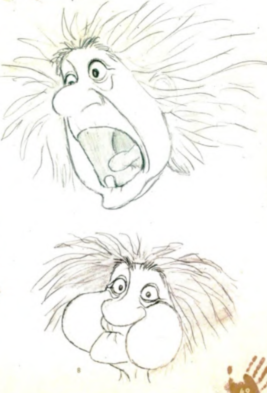

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1 • TAKAO NOGUCHI & DOMINIQUE LOUIS
2, 5, 7 • CHRISTOPHE LAUTRETTE
3 • CARTER GOODRICH
4, 6, 8 • JAMES BAXTER

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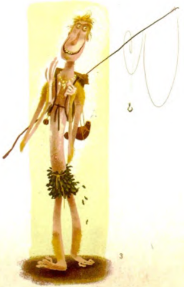

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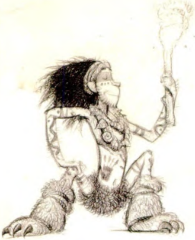

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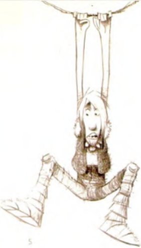

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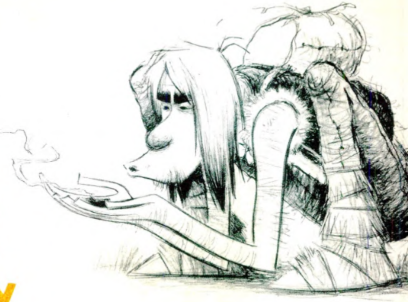

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GUY

Guy is everything that Grug isn't: Young, daring, imaginative, and smart. He's also charismatic and appealing, particularly to Eep. "Guy is an interesting character because he represents a lot of different things in the film," says director Chris Sanders. "He's the guy who lives outside, he relishes adventure – but he's a dead end as well. He needs the Croods as much as they need him if he's going to continue."

In the original script, while Guy was still headed for Tomorrow, he was a somewhat wacky dude named Wimmett who wore a feather skirt and moved like a monkey. But it didn't look right. The filmmakers realized that he needed to be more manly and good-looking. After all, it was argued, would Eep really be attracted to a nerd? He also needed to look different from the Croods, since he was a more evolved species.

While the story changed to suit the new Guy, it took a number of attempts before the right look was found – one that was a balance between brains and beauty – that really represented what he was all about. "We ended up making him taller and broadening him out, giving him a more muscular look," production manager Jed Schlanger says. "He had to look like he was in his twenties at least. We added visual cues such as a slight sharpening of his facial features, a slight wrinkling around the eyes, and a little stubble on his chin that told us that he is older, wiser, and stronger."

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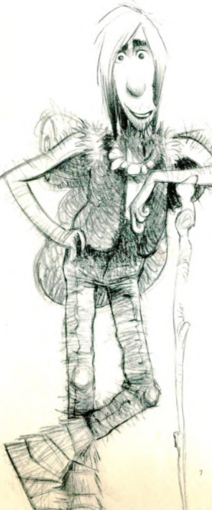
2 • TAKAO NOGUCHI
3, 5, 6, 7, 8 • SHANE PRIGMORE
4 • CARTER GOODRICH



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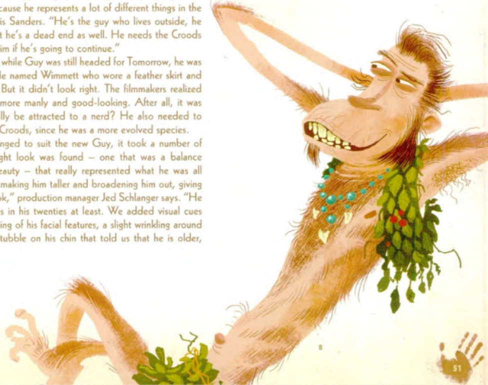

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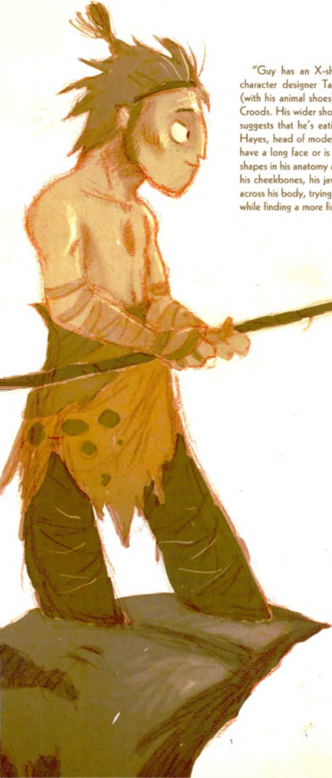
"Guy has an X-shaped body and a hexagon-shaped face," says character designer Takao Noguchi. "His thin waist and wide ankles (with his animal shoes) emphasize the difference between Guy and the Croods. His wider shoulders indicate his toughness, while his narrow chin suggests that he's eating cooked food, not just raw meat." Notes Jeff Hayes, head of modeling: "Takao defined the broad strokes – does he have a long face or is it a little square? – while we explored the subtle shapes in his anatomy and facial features to find his identity. We adjusted his cheekbones, his jawline, his eyes and nose, and the muscle contours across his body, trying to stay true to the intent of Takao's original design while finding a more finished form of it."



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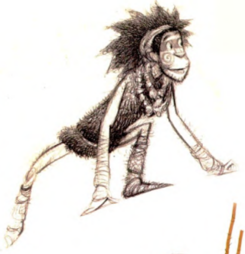

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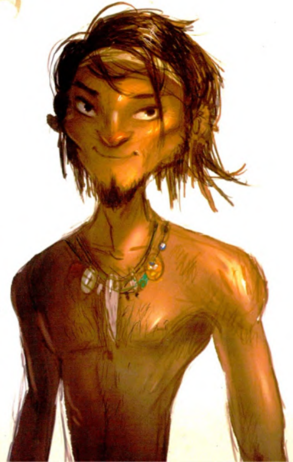

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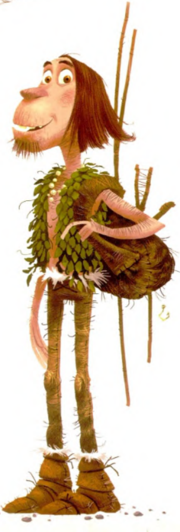

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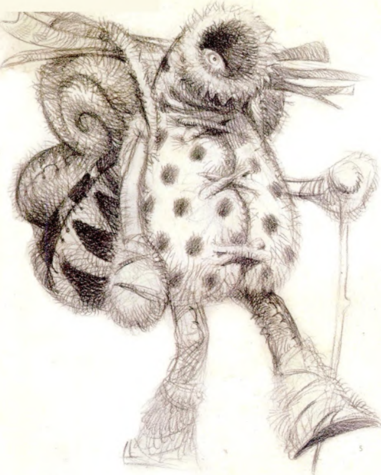

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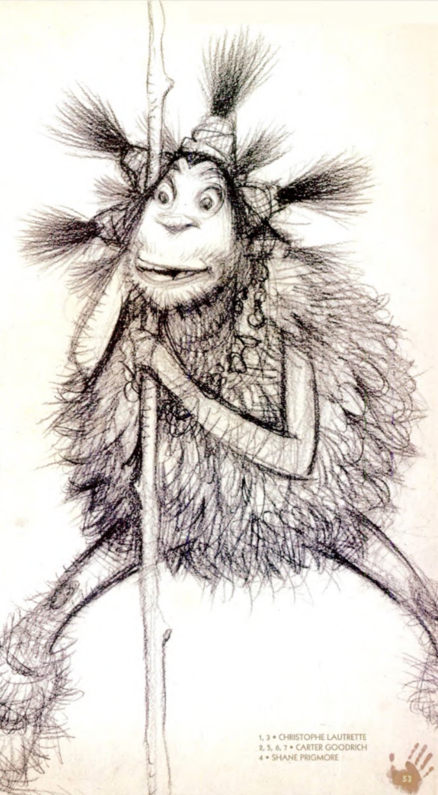

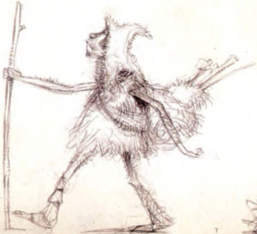

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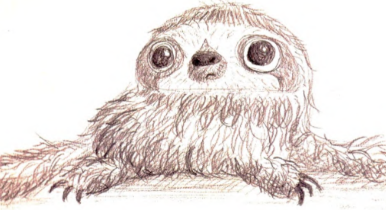
1, 3 • CHRISTOPHE LAUTRETTE
2, 3, 6, 7 • CARTER GOODRICH
4 • SHANE PRIGMORE



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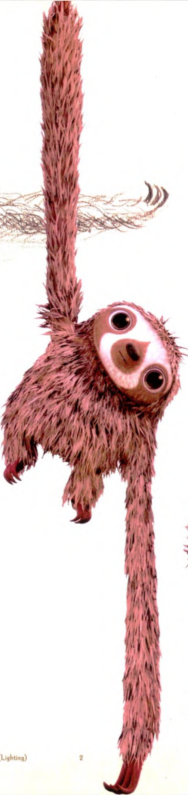
BELT

Guy's right-hand pet is Belt, an appealing little sloth he wears around his waist as – what else – a belt. Smart and wise, Belt evolved from an earlier idea that saw Guy wearing a small mammal as an accessory. "We thought of creating a bag from a dead animal, but I wanted it to have a little more charm," character designer Takao Noguchi says. Combining the idea of a koala's pouch with a sloth, Noguchi envisioned that Guy would use the creature's pouch to store things and the sloth part of it, being slow, wouldn't care. While the bag idea didn't stick, the design of the character did. It was such a hit, in fact, that Belt ended up having a larger role than Noguchi ever imagined, and was given voice by none other than director Chris Sanders.

According to producer Kristine Belson, Belt became "a breakout character. He eventually evolved to be the smartest member of the cast. He's like Snoopy, another character that was always way more sophisticated than the humans around him and had a higher understanding."

Belt replaced another beloved character, Pet, who was the first animal companion envisioned for Guy. The diminutive equine, sketched by character designer Carter Goodrich and more fully realized by Noguchi, "was like a little dog in a sense, a little sidekick" that everyone loved, says head of surfacing Sabrina Riegel. Pet's evolution went as far as character technical direction, but in the end it was decided that Belt's human-like qualities would be more appealing to audiences. "Belt came along and stole the show," Riegel says.



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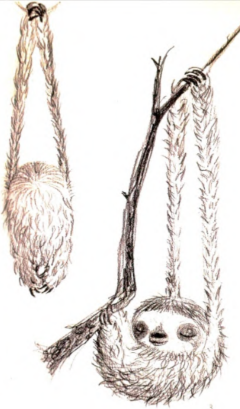

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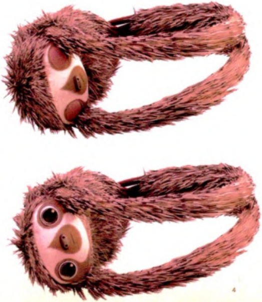

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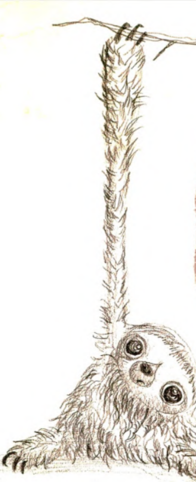
1, 2, 3, 4, 5, 7, 8 • TAKAO NOGUCHI
6 • TAKAO NOGUCHI & ARTHUR FONG
9 • FERNANDA ABARCA (Surfacing), GABRIEL PORTNOF & MATTHEW WATERS (Lighting)



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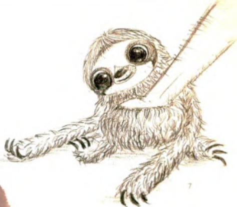

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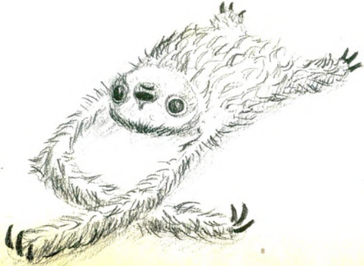

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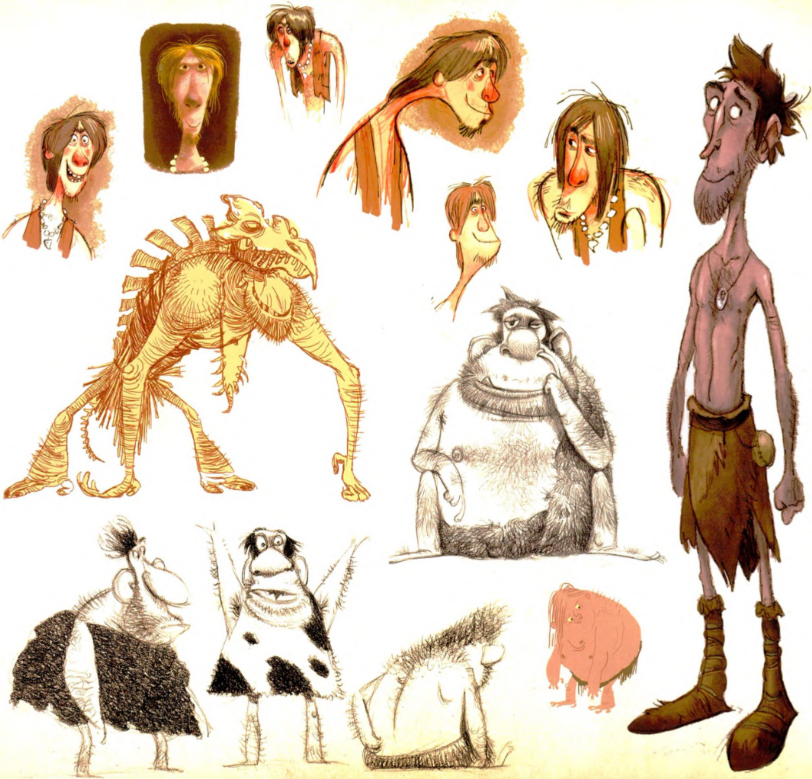
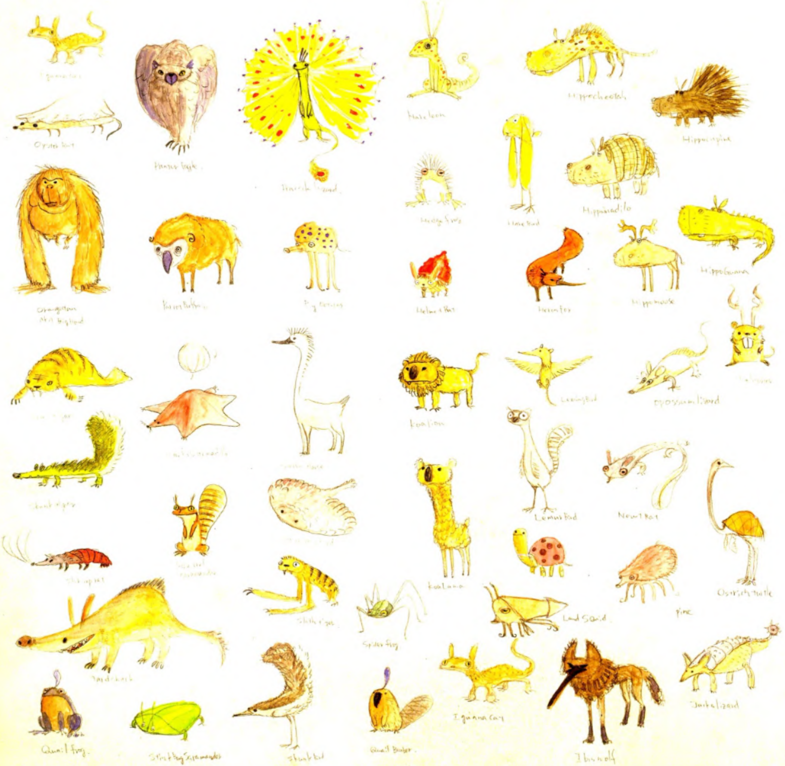
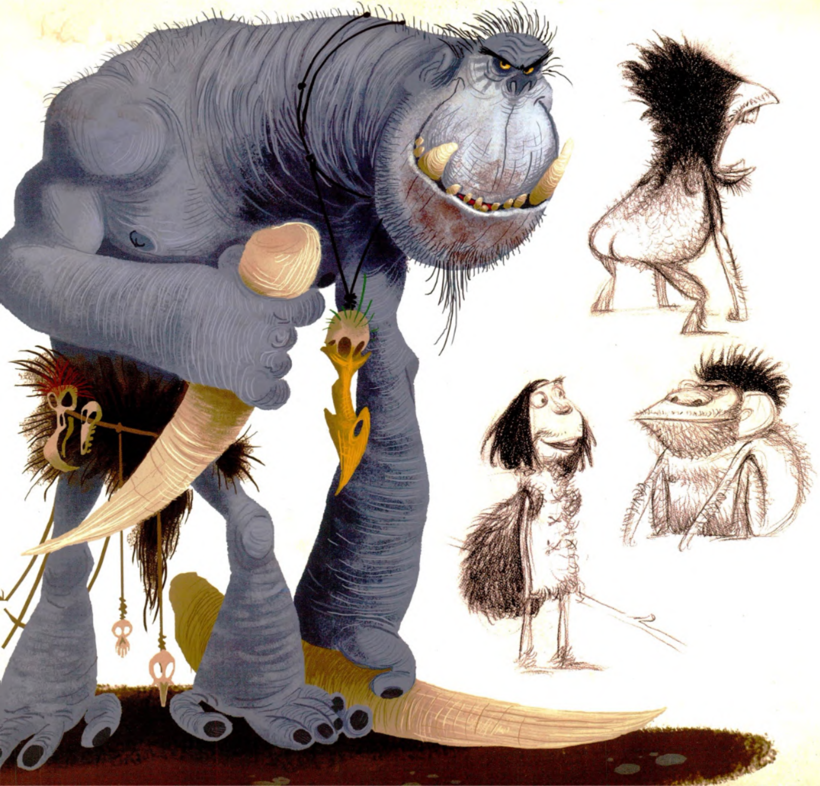
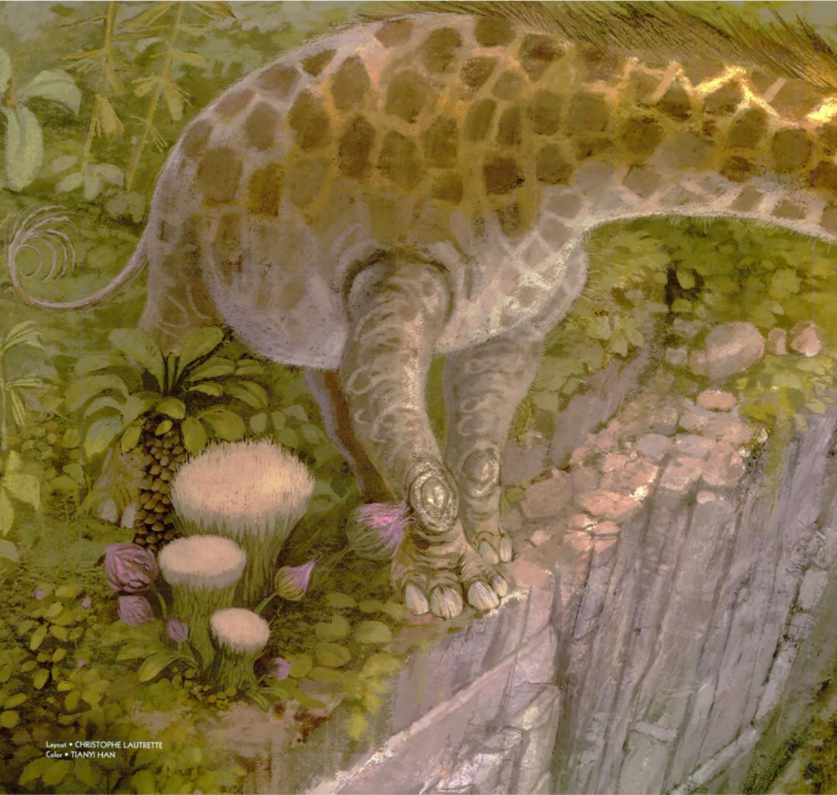
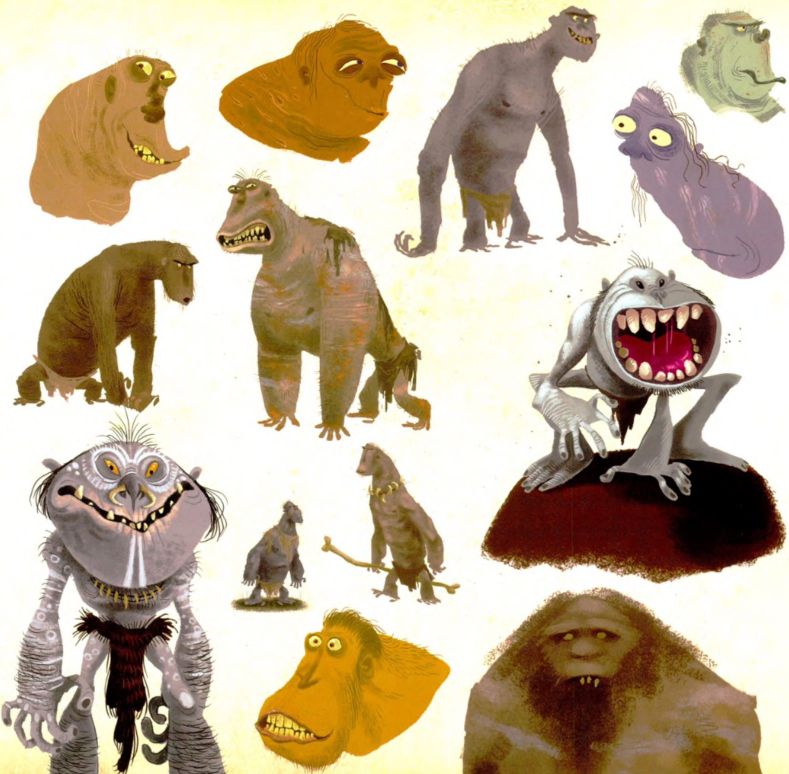


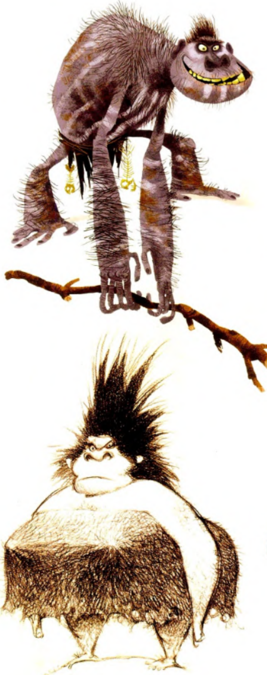

Oyster Rat
Panther Eagle
Peacock lizard
Hareleon
Hippocheetah
Hippocupine
Orangutan
Big Head
Parrot Buffalo
Pig Octopus
Hedge frog
Hare Bird
Hippoarmadilo
HippoGuana
Helmet Bat
Heronfox
Hippomoose
Koalion
Leaving Bird
Opossum lizard
Skunk alligator
Lemur Bird
Newt Rat
Koalama
Ostrich turtle
Shrimp rat
Sloth tiger
Spider frog
Land Squid
pine
Aardshark
Quail frog
Stink bug Salamander
Skunk bird
Quail Beaver
Iguana Cat
Ibis wolf
Jackalizard

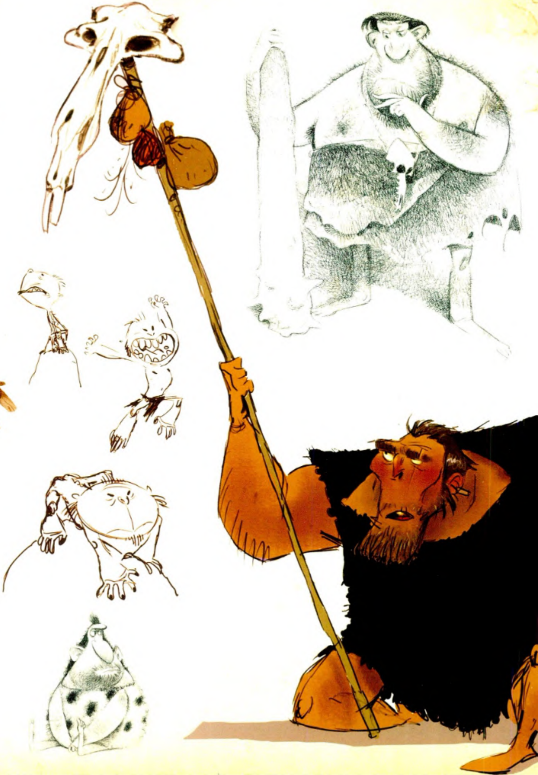




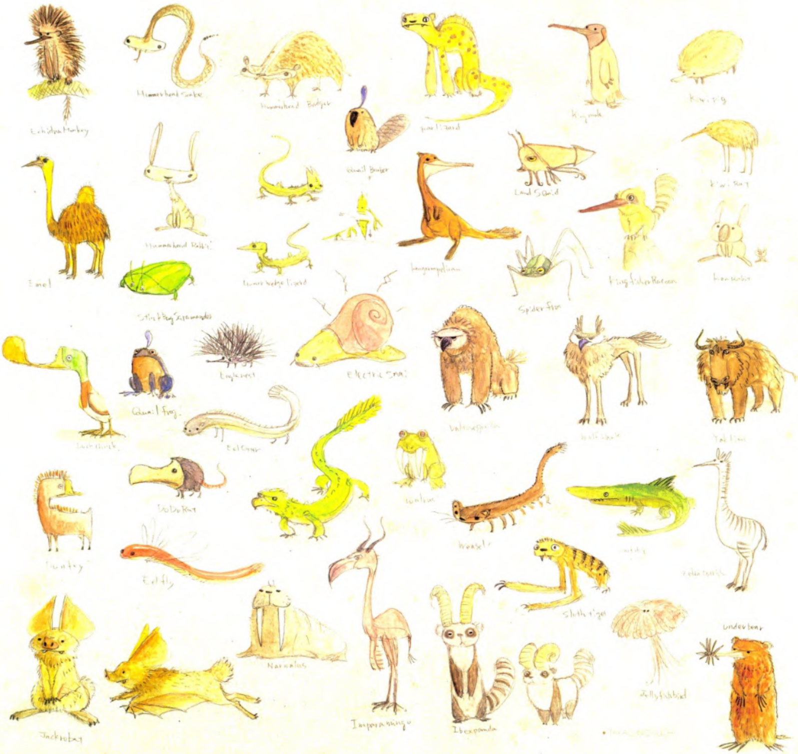
Layout • CHRISTOPHE LAUTRETTE
Color • TIANYI HAN







- SHANE PRIGMORE
- SHANNON TINDLE
- CHRISTOPHE LAUTRETTE
- CARTER GOODRICH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Hammerhead Snake
Hammerhead Badger
Quail Beaver
pard lizard
King mole
Kiwi pig
Land Squid
Kiwi Rat
Emel
Hammerhead Rabbit
Hammer Wedge lizard
Kangaroopelican
Spider frog
Kingfisher Racoon
Hen Robit
Stink Bug Salamander
Duckchick
Quail frog
Eaglenest
Electric Snail
Eel Otter
Vulturegorilla
Wolf Hawk
Yak Lion
Dunkey
DoDo Rat
Walfrog
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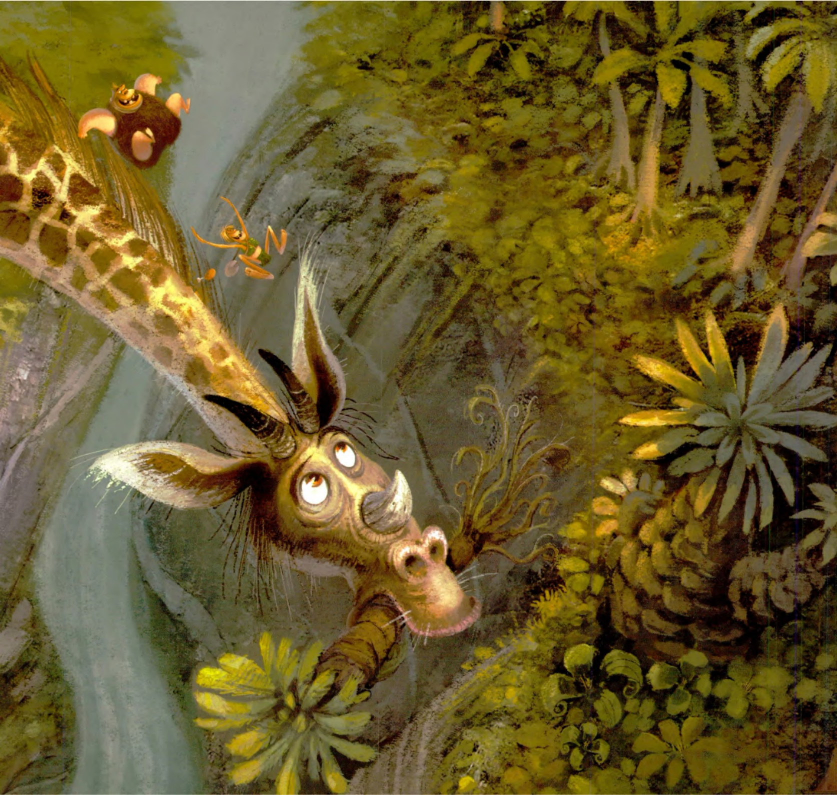
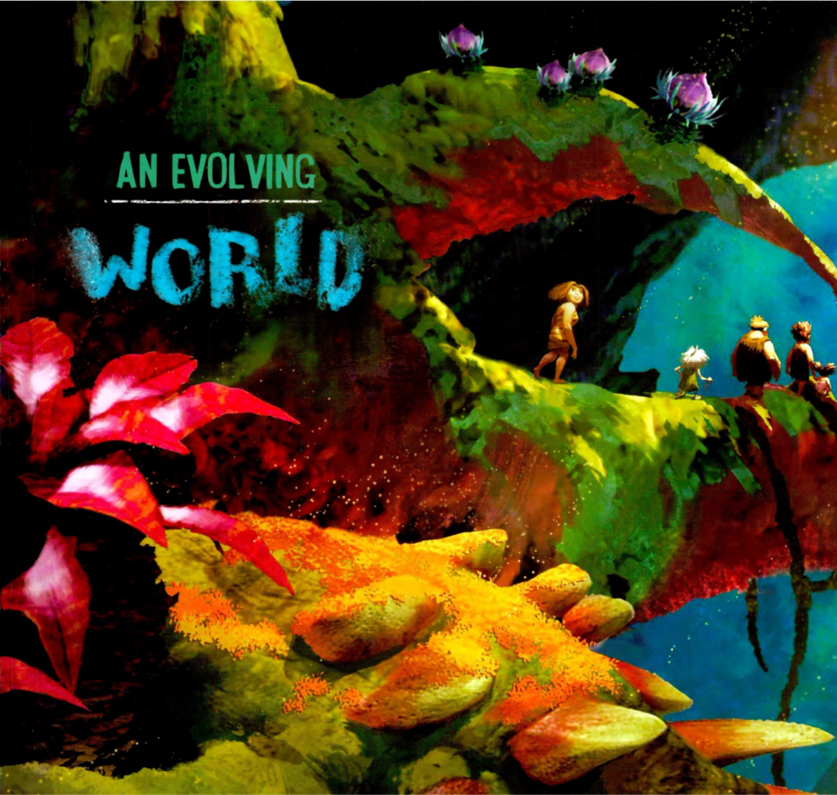
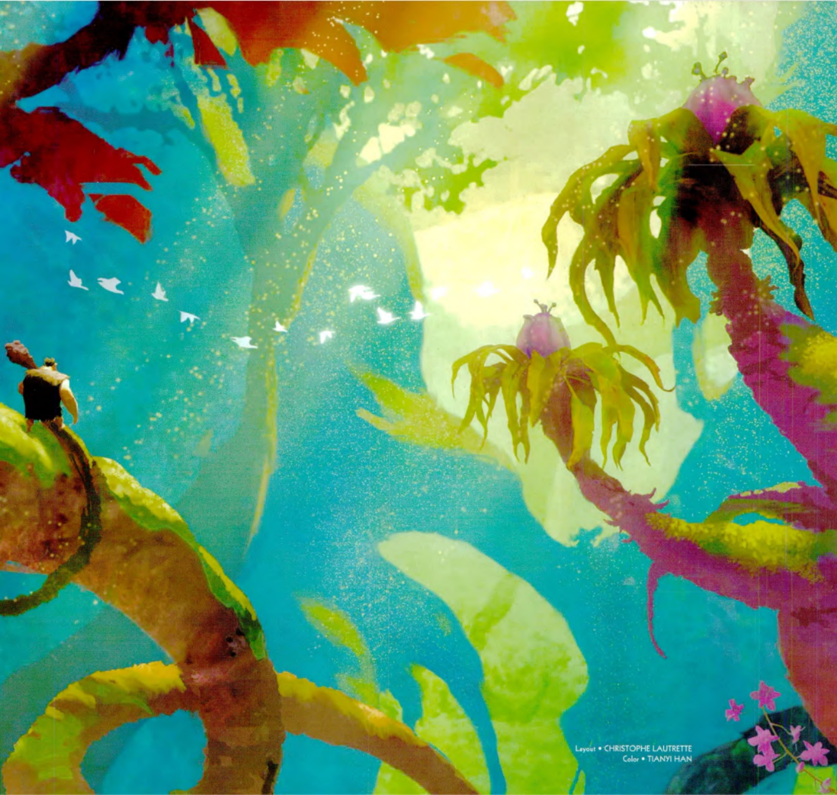


AN EVOLVING WORLD





Layout • CHRISTOPHE LAUTRETTE
Color • TIANYI HAN

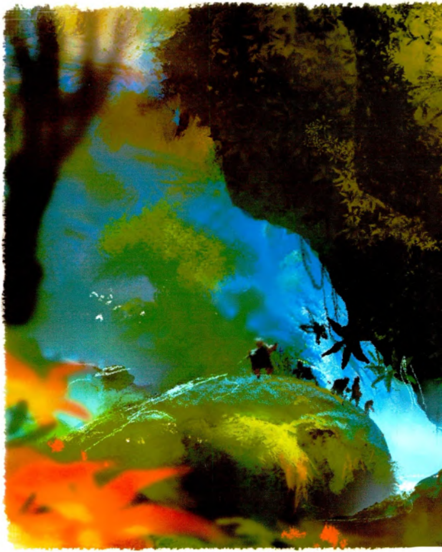
At its core, *The Croods* is a complex tale about the value of imagination, overcoming fear, and taking chances. How better to exemplify these themes than by having a prehistoric family travel through a new world filled with real and perceived danger and then having them emerge victorious on the other side?

Because there was nothing for the artistic team to reference (no fossil records exist for the Croodaceous!) it was the chance for imaginations to run wild. The idea of fashioning a land from scratch was especially tantalizing for production designer Christophe Lautrette. "For an artist, there's nothing better than having the opportunity to create a world that doesn't – but could – exist," says Lautrette, who credits Dominique Louis, an early art director on *The Croods,* for his contributions to the initial lighting concepts and visual development of the film. "The whole idea of the story – with its whimsical, colorful, and transforming nature – was an endless source of inspiration for me," recalls Louis. The process was exciting but challenging, notes Lautrette, "because you had to design every single plant and leaf, and they had to seem real. You had to be alert to things you had seen before in your life and put your own spin on them." Which is exactly what he and subsequent art director Paul Duncan did. Inspired by their separate experiences as world travelers, the duo talked about remote locations they had visited and incorporated stylized elements of them into their designs. "The world we were creating had to be completely original yet hold elements of familiarity," agrees Duncan, "otherwise it would look like a sci-fi planet and not our own prehistoric Earth."

Nor could everything be made oversized, which was a natural impulse. "The first, easiest thing to say would be something like, 'It's a rabbit, but it's a *giant* rabbit!" recalls director Kirk DeMicco, of conversations in pitch meetings. "That would get attention. But then we realized if all the creatures and atmosphere were giant, the Croods would seem like miniatures and our movie would become 'Honey, I Shrunk the Caveman.'"

One of the sweet spots in the exploration of what *The Croods* would become emerged when character designer Shane Prigmore envisioned various creatures that would populate the film as hybrid animals. In keeping with the tenet that this is a world that might have existed, "We felt more comfortable with the hybrid idea because it could be said these are creatures – such as half crocodile, half dog – that later split at some point in pre-history into separate animals," director Chris Sanders says. "We pictured them as evolutionary dead ends," adds DeMicco. "We were already in a fantastic world with stylized human characters," production manager Jed Schlanger says, "and bringing some 'logic' and 'familiarity' into our creature designs would help us ground the world and make sure we weren't getting too alien."

Finding that balance between the real and the fantastical proved to be the biggest challenge of the production. "The best thing about it, even from the artists' standpoint, was that we could do anything we wanted," says DeMicco, "but the worst thing about it was that we could do anything we wanted. It took a long time to find what that tone was. We wanted to have a story that would be a broad comedy but that would also make an emotional connection with the audience."



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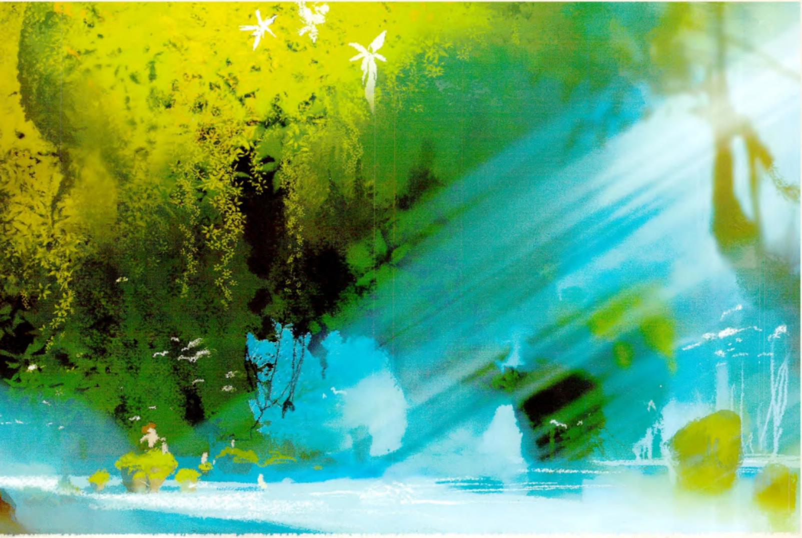
Lighting, which plays a significant role in the visual language and design of *The Croods,* also helped in realizing the film's ambitious directive. "For us, it's important to ground the audience in a world that is physical and tangible, referring to a time before time on Earth where the story takes place," says VFX supervisor Markus Manninen. "It instantly describes the rules of the world, the dangers, physical capabilities, and sizes. The physical lighting and the material responses were key aspects to describing this world, a shorthand with the audience, and it allowed us to be imaginative with our designs."

Pages 64-65: ARTHUR FONG 1 • DOMINIQUE LOUIS 2 • MANNY FRAGELUS (Modeling) & PAUL DUNCAN



"WHAT WE LEARNED ALONG THE WAY WAS THAT IF THIS ERA WASN'T FUN AND INTERESTING – AND IN SOME WAYS EXAGGERATED – IT DIDN'T FEEL LIKE OUR WORLD. BUT IF IT DIDN'T FOLLOW SOME PHYSICAL RULES, IT STARTED BREAKING AWAY FROM WHAT OUR MOVIE IS."

– MARKUS MANNINEN, VFX SUPERVISOR

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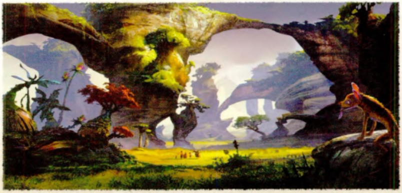
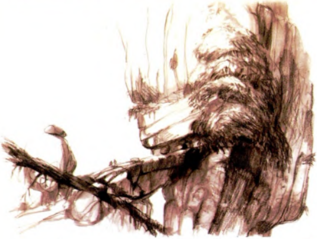


CAVE SWEET CAVE

At the film's start, the Croods' cave is, for better or for worse, the center of their lackluster existence. Set deep inside a canyon, it's a dark and barren place, highlighted by the crude drawings that pepper the walls depicting scenes of cavemen who ventured out into the world and tried new things. Each vignette ends the same way: In death!

"It took us quite a while to find the right look and location," recalls production designer Christophe Lautrette. "It could be anywhere in the world." Early in development, their home turf was positioned close to an ocean. Later iterations placed it on a hill, in a forest, near a river, and next to a waterfall. A photography expedition to Utah's Zion National Park served as further motivation for the art department. "Our field trip to Zion was really inspiring in terms of exploring dramatic and complex natural environments," recalls former *Croods* art director Dominique Louis.



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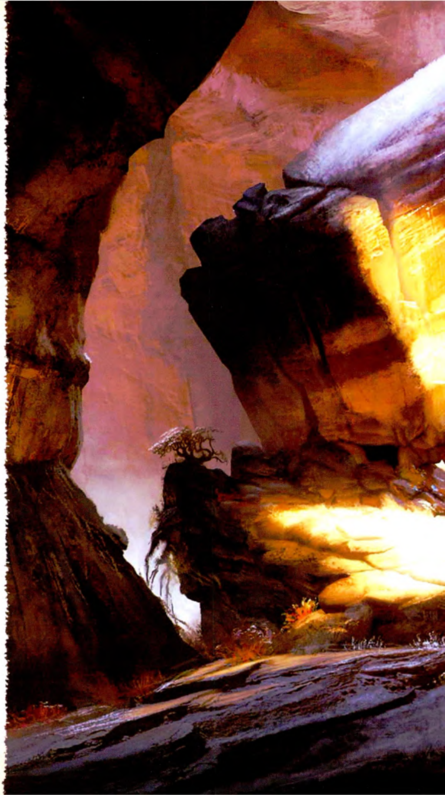
As the script developed and it became clearer that the Croods were not so much hunters as they were like mice, dashing out in search of food and scurrying back after their hunt – lest they fall prey to the constant thorn in their side, the carnivorous Bear Owl – it seemed obvious that the cave should be in a more hidden setting. The art department explored placing it under a giant boulder, but that idea was deemed too precarious. That's when Lautrette remembered something he saw at Zion: Two cliffs converged together, leaving only a crack wide enough to walk through, which ended up being a perfect idea for the Croods' home. "The Croods live at the narrow end of a deep canyon – a prehistoric cul-de-sac," says director Chris Sanders. "It's a subtle metaphor that illustrates where the Croods are, both mentally and as a species. If nothing changes, they're at a dead end."



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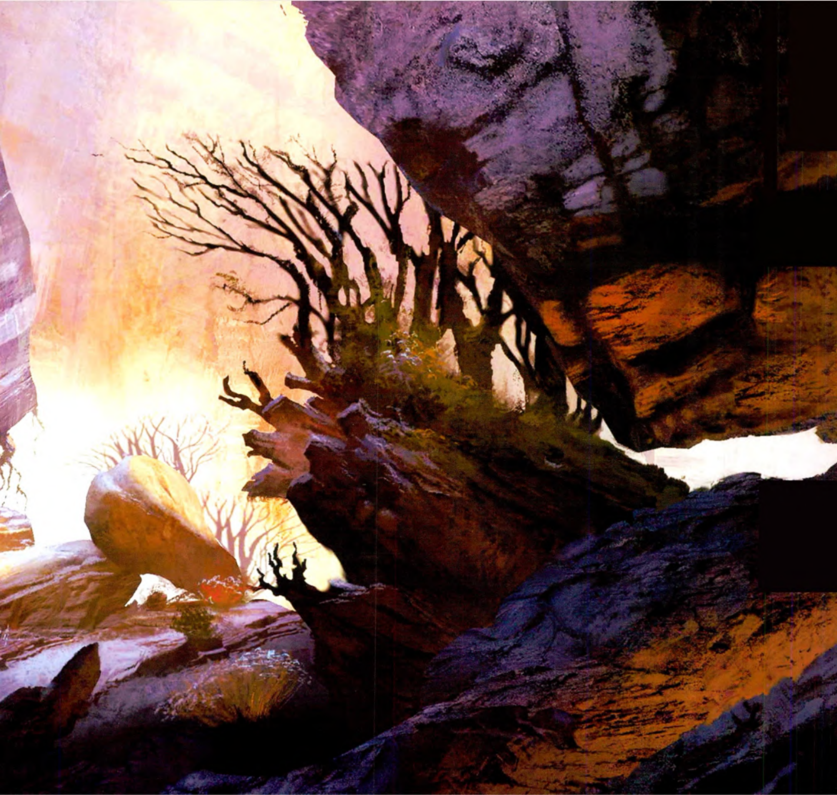
1 • EMIL MITEV 2 • EMIL MITEV & DOMINIQUE LOUIS

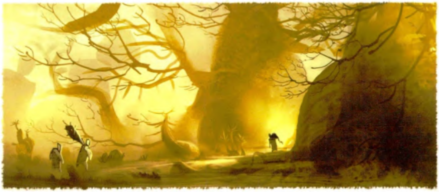


With the location in place, Lautrette and his team turned their attention to the overall look of the site. It was important to them that the earth tones used to evoke dry desolation contrasted sharply with the colorful world the Croods discover after the earthquake. "We made the cave and canyon sequence very dry and inhospitable," says art director Paul Duncan. "Like you'd want a glass of water after watching our opening desert scenes. The juxtaposition of monotone dirt hues with the new world jungle reveal of Act Two is a very *Wizard of Oz* moment." Adds Sabrina Riegel, head of surfacing: "The environment had to give off a sense that it was not necessarily bleak, but living in the dry, bare environment would make everyday life for the Croods a challenge. It's rugged and desolate, but even so, it has a beauty to it. The rock walls have a lot of complex color embedded into them and we put in subtle details, such as soft sand ripples in the ground."

One of the film's ongoing motifs, light, begins in the canyon, first when Eep stretches out her hand to catch the last rays of sun before it goes down and later that evening when Guy's fire lights the canyon walls. In both instances, the effect is dramatic. "What makes the lighting so captivating in *The Croods* is that it takes a step further in enhancing the visual experience," says VFX supervisor Markus Manninen.

With the help of cinematographer Roger Deakins, who consulted on *How to Train Your Dragon*, the art department used lighting to strengthen composition and use value structure in different ways than previously attempted. "Working with Roger helped us embrace a style of lighting that had a subtlety and quality that isn't easy to achieve in animation, something we had to pursue new technology development and work flow to achieve," Manninen says. "The lighting became more motivated and, by design, defined by the storytelling."

For the Croods, hunting for food is both a family affair and a competition with the strange assortment of animals that live in the canyon. In the first act, the Liyotes (half lizard, half coyote), the Trip Gerbils (naughty Siamese rodents that share a tail), and the Jackrobat (half jackrabbit, half bat) do their best to steal from the Croods the giant egg the family have themselves stolen from the fierce, big-horned Ramu (half ram, half emu). In the commotion, a sleeping Girelephant (a giraffe/elephant hybrid) is awakened and joins the fray. Casting the creature roles – throughout the film – was easy: Just as they had a collection of varied landscapes, the art team had a stockpiled menagerie of peculiar animal hybrids, created during the character development process, from which the filmmakers had the luxury of choosing. "Having a large library of creatures that were ready for production enabled the directors to use it like central casting," notes production manager Jed Schlanger. "If they found a need for a creature in a sequence, they knew they had a cast of day players available with special skills and looks."



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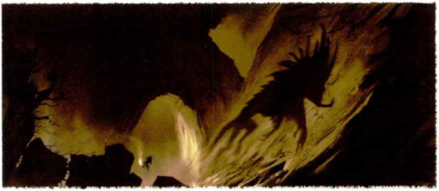

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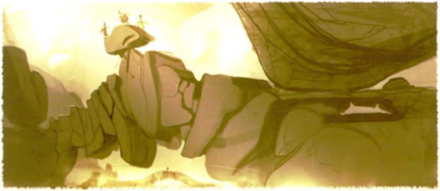

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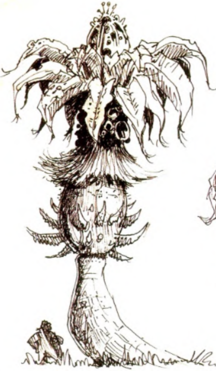
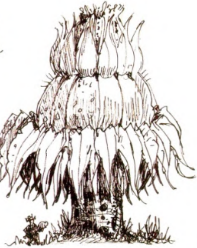
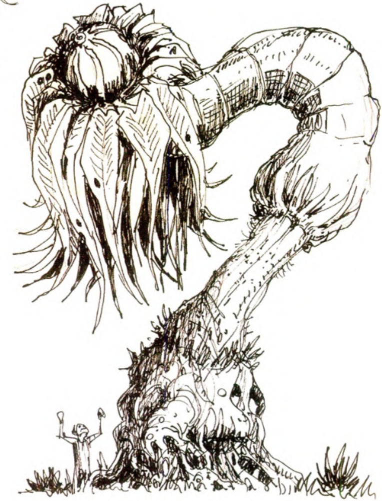
1, 2, 3 • SIMON RODGERS 4 • NICOLAS WEIS

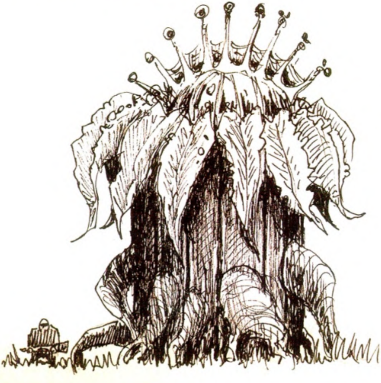


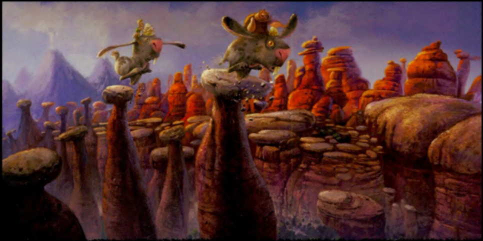


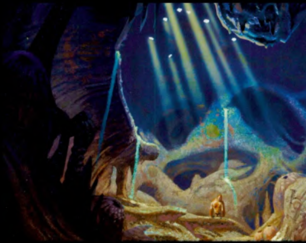
"THE CROODS LIVE AT THE NARROW END OF A DEEP CANYON – A PREHISTORIC CUL-DE-SAC. IT'S A SUBTLE METAPHOR THAT ILLUSTRATES WHERE THE CROODS ARE, BOTH MENTALLY AND AS A SPECIES. IF NOTHING CHANGES, THEY'RE AT A DEAD END."

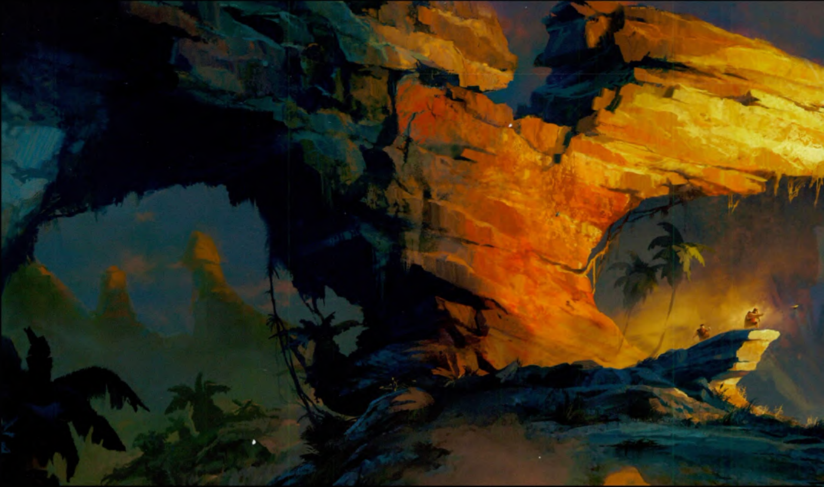
CHRIS SANDERS, DIRECTOR











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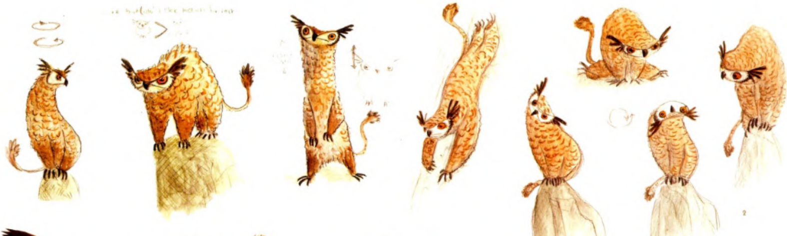

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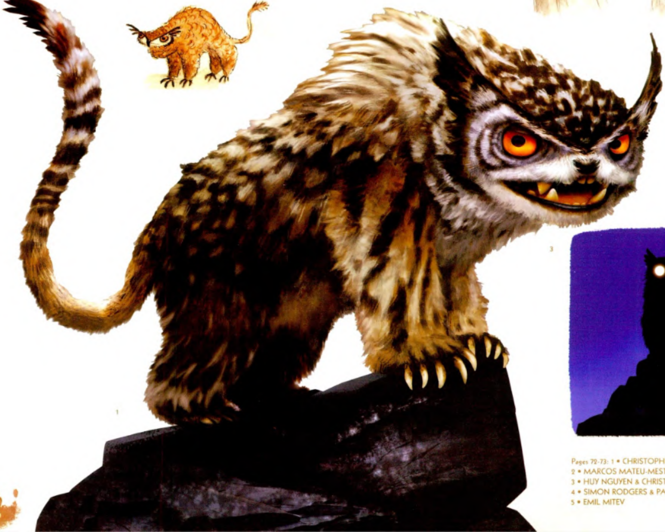

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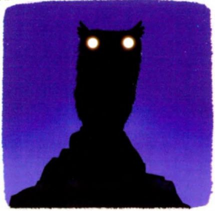

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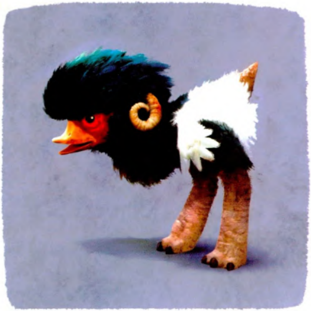
Pages 72-73: 1 • CHRISTOPHE LAUTRETTE & TIANYI HAN
2 • MARCOS MATEU-MESTRE & BILL KAUFMANN
3 • HUY NGUYEN & CHRISTOPHE LAUTRETTE
4 • SIMON RODGERS & PAUL DUNCAN
5 • EMIL MITEV



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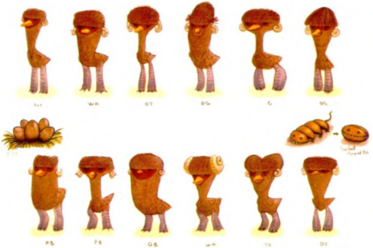
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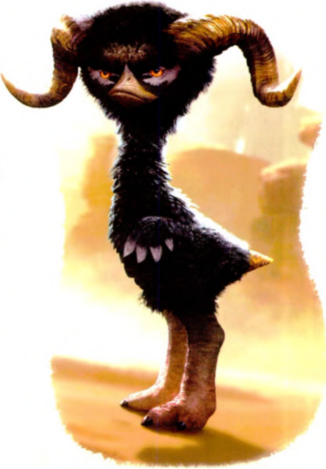

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1, 3, 6 • TAKAO NOGUCHI 2 • ABRAHAM MENEU OSET (Modeling) & ARTHUR FONG 5 • EMIL MITEV
4 • TAKAO NOGUCHI & DOMINIQUE LOUIS 7 • TAKAO NOGUCHI & LEIGHTON HICKMAN

2

"WE WERE TRYING TO KEEP THE CREATURES AND THE WORLD GROUNDED BUT AT THE SAME TIME RETAIN A WHIMSICAL SIDE."

KIRK DEMICCO · DIRECTOR

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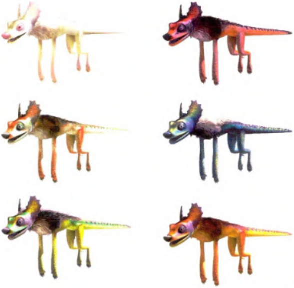

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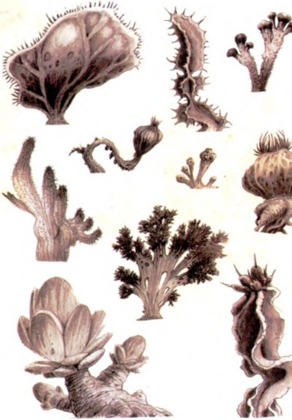
Opposite Page: TAKAO NOGUCHI
1 • TAKAO NOGUCHI & MARGARET WULLER
2, 3 • TAKAO NOGUCHI 4 • TAKAO NOGUCHI & LEIGHTON HICKMAN

THE JUNGLE



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The Croods' decision to travel into the jungle is hastened by the untimely presence of the Bear Owl, who is pursuing them yet again after the collapse of their cave. Leaping wildly over the edge of the cliff that separates the canyon from the jungle, the family tumbles down into a topsy-turvy world with overgrown roots and strange plants, at one point during preproduction known internally as the Bottom of the World. "I liked the appellation because it felt as though the jungle was the underbelly of the world, that they were in the guts of it, in the middle of an organism," production designer Christophe Lautrette says. "When they fall, they fall to a different realm with a different temperature. Everything is above them."

1 • NICOLAS WEIS 2 • HUY NGUYEN

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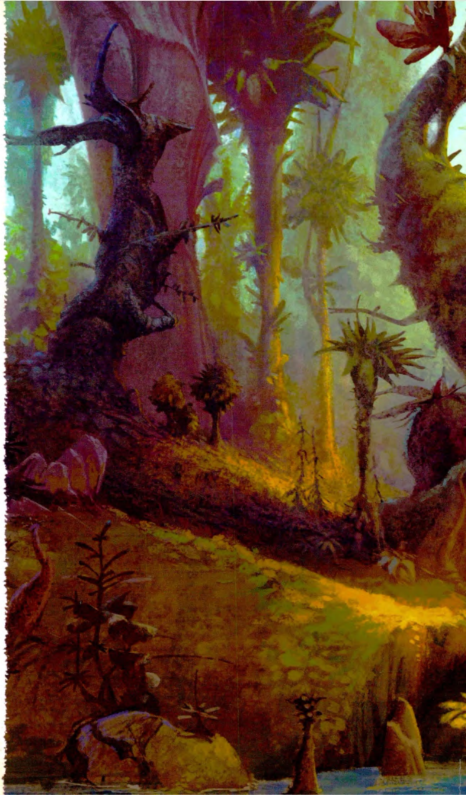
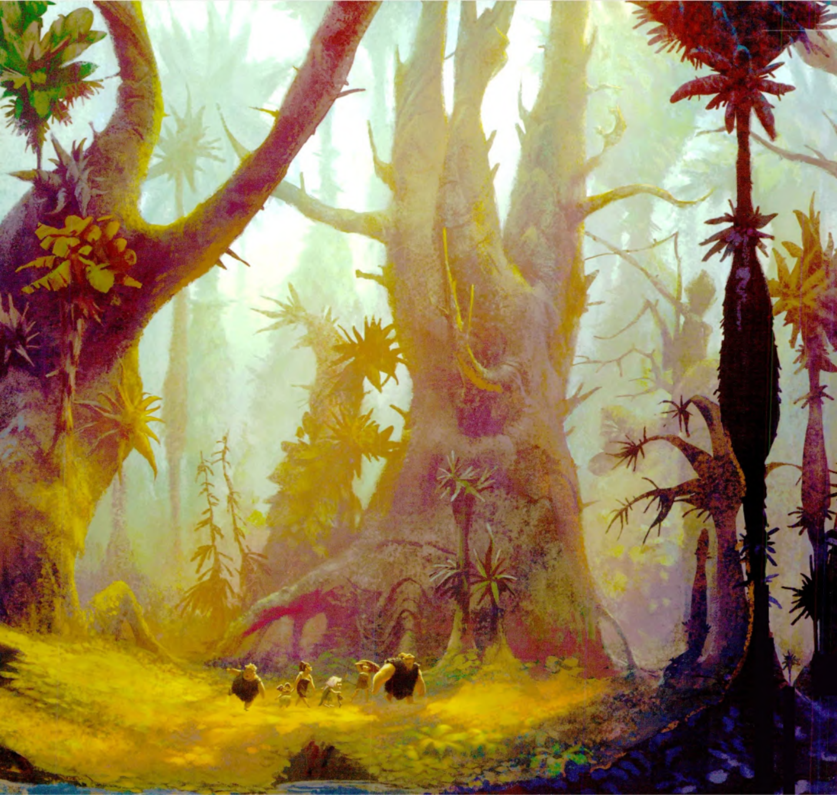
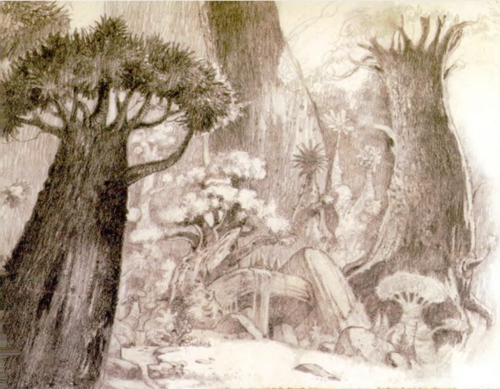
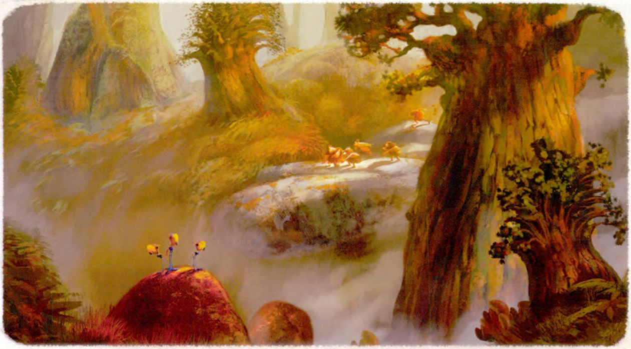




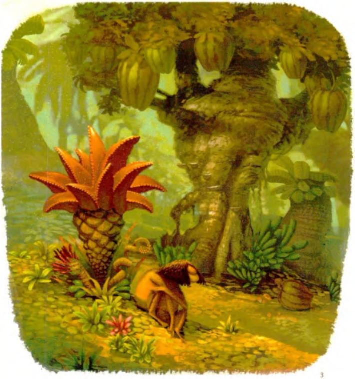


Swathed in blues and greens, finding the right look for the wet and mossy jungle took "many iterations," says Lautrette. The art department decided to create an underwater feel and studied images of mangrove swamps to achieve the look they wanted. "These underwater root systems close to the surface look like otherworldly jungles," says art director Paul Duncan. "Details drop away with distance and become silhouettes, but there's no atmospheric mist like you would see in regular forest photos." It instantly gave them a unique, lush tropical environment, completely different from the Croods' dry valley. "You get an eerie feeling from the fact that you don't see too far – but you do see a lot of local color. It was the best of both worlds," adds Lautrette, whose vision was jungle atmosphere that could be interpreted as dangerous, at least by the ever-cautious Grug. Eep, on the other hand, is having the time of her life. "It's more appealing to her because something new has finally appeared in her life," he says.

In this surprising world, the Croods soon discover that anything is possible – including plants that are animals, like the Bear Pears (adorable terrors that hang by their tails on vines and branches); the dainty dandelions that aren't so dainty; the diminutive Mousephant that Sandy catches; and a giraffe-like tree, the top of which audiences never see, that appears to be rooted in the ground until the Croods climb up into it and the beast runs away. "Not every creature has a role in the movie, sometimes they're just atmosphere," says Lautrette. "They play an important part in the surroundings, however. They serve to accentuate the strangeness of this place."



1 • CHRISTOPHE LAUTRETTE 2 • EMIL MITEV 3 • CARTER GOODRICH, CHRISTOPHE LAUTRETTE & BILL KAUFMANN
4 • RONNIE CLELAND (Surfacing) 5 • ROBBIN HUNTINGDALE (Surfacing) 6 • CHRISTOPHE LAUTRETTE & SHANE PRIGMORE



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Then there are the Punch Monkeys. Part atmosphere, part comic relief, they have no interest in the rest of the Croods, but take delight in welcoming Grug to the jungle by doing what might be expected: They punch him in the face. Repeatedly. Passing through where the Monkeys perch themselves on extended branches and Mangrove tree roots, Grug is pummeled by the Francois Monkey-like primates with hands the size of boxing gloves. The brainchild of director Chris Sanders, the Punch Monkeys were easy picks for inclusion in the story. "They were a perfect example of something looking colorful and cute but being anything but," says Lautrette. "They're another way of expressing that the Croods don't know what to expect in this world."

The creature with the biggest role is the Macawnivore, a vibrantly multicolored feline predator who picks up where the Bear Owl left off, the apex predator intent on making the Croods his dinner. Audiences meet him in the jungle where he blends in effortlessly, and from this point forward he tracks Grug relentlessly throughout the film. Sanders, who, when he's not directing animated films, creates his own stylized comic books, drew the first version of the Macawnivore as a prehistoric saber-tooth tiger with an oversized head and undersized body. Character designer Takao Noguchi designed it in 3D and the modeling department sharpened it. But the tiger wasn't fantastical enough. It was when visual development artist Leighton Hickman gave the creature the colors of a tropical bird and Duncan jokingly dubbed it a Macawnivore, that it instantly became a home run. "This one we didn't have to play around with," Lautrette says. "It was a really fast character to find."

> "THE CROODS NEED TO BE CAUTIOUS ABOUT THEIR NEW SURROUNDINGS BECAUSE THEY HAVE NO IDEA WHETHER OR NOT THE PLANTS WILL EAT OR HARM THEM."
>
> CHRISTOPHE LAUTRETTE
> PRODUCTION DESIGNER

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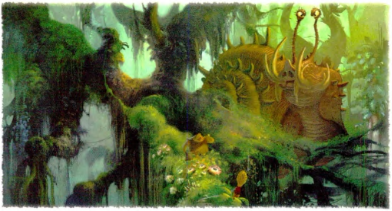

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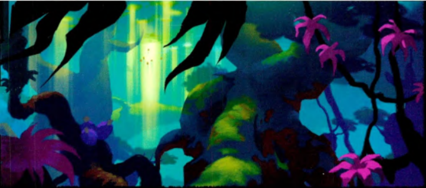
4, 5 • JOACHIM DE BRUNIER (Modeling)



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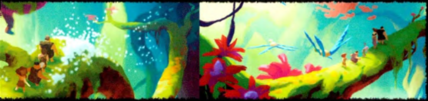

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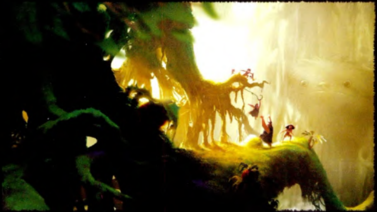

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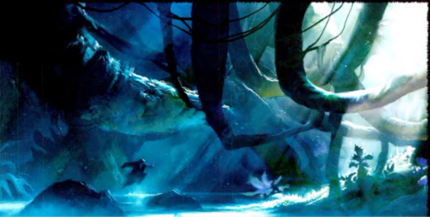

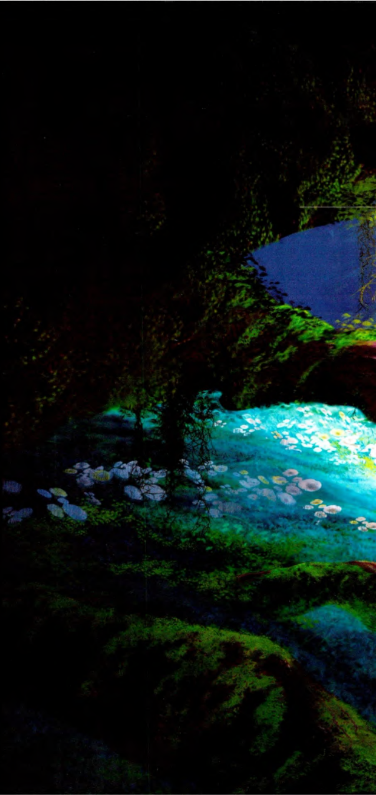

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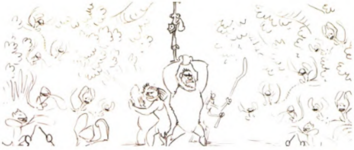

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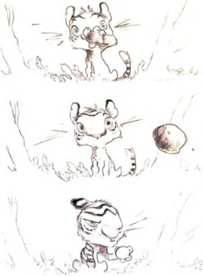

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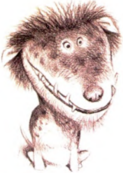

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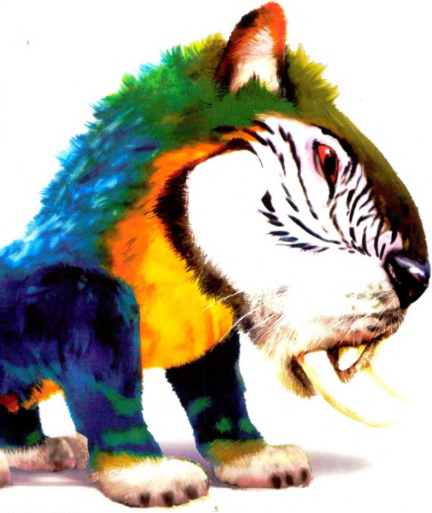

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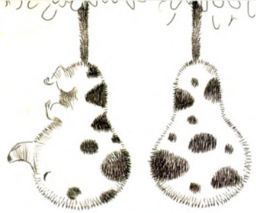
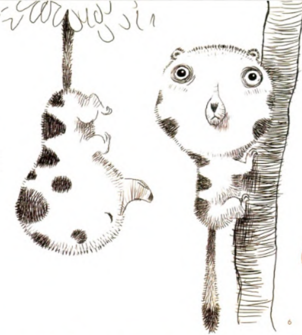
Pages 82-83: 1, 2 • ARTHUR FONG 3 • LEIGHTON HICKMAN 4, 5 • MARGARET WULLER





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1, 7, 9 • TAKAO NOGUCHI 2 • SIMON WELLS 3 • CHRIS SANDERS
4 • CARTER GOODRICH 5 • TAKAO NOGUCHI & LEIGHTON HICKMAN
6 • SHANE PRIGMORE 8 • TAKAO NOGUCHI & MARGARET WULLER

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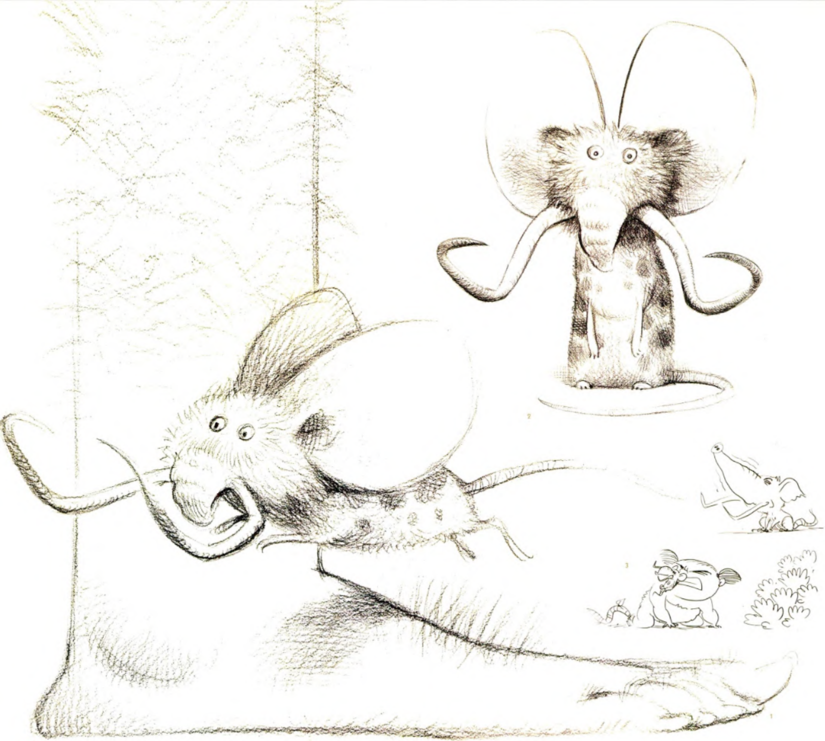

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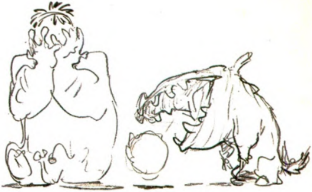

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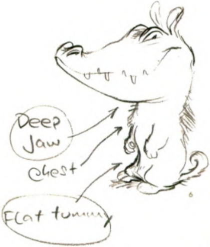

Deep Jaw
Chest
Flat tummy

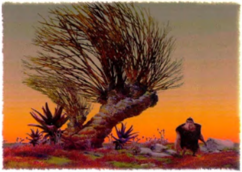
6

7

THE TUNDRA

It's a whirlwind scene: After being chased out of the relative safety of the jungle and into a vast tundra by the Macawnivore, the Croods take cover in what appears to be a cave. In reality it's the mouth of a dispassionate Land Whale. Seconds later, they're spewed out unceremoniously – only to be nearly annihilated by an undulating wave of vicious red Piranhakeets. That's when Guy first comes to the rescue with his torch. ("I love that in *The Croods*, it can be these tiny birds flying in mesmerizing formation that can pick you to the bone. It's not just the big, hulking beasts you have to fear," says art director Paul Duncan.)

Majestic Alaskan landscapes, especially groundcover that grew over previously frostbitten topography, inspired much of the crimson-hued tundra, which visual development artist Margaret Wuller helped find and incorporated into the environment's design. "It was an odd and interesting color scheme," production designer Christophe Lautrette says. "It was easy to hide our Piranhakeets among the grass." It was also a vastly different terrain from the giant leaves and root systems of the jungle and one that the *Croods* team, particularly Lautrette, Manninen, and Duncan, were fond of.



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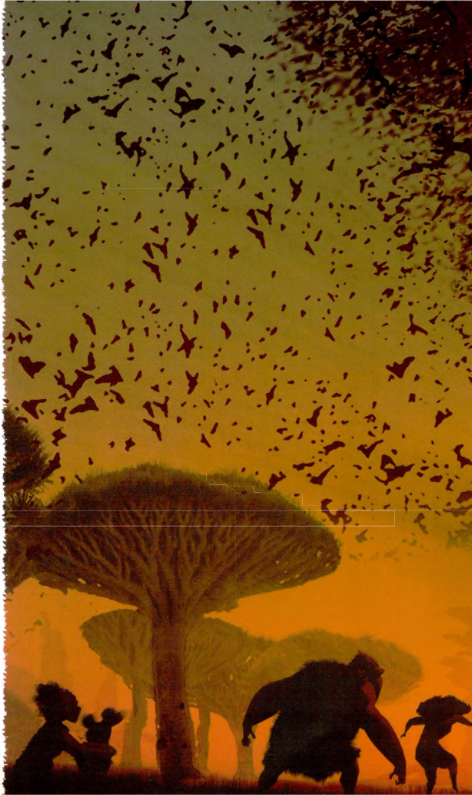
"There's nowhere for the Croods to hide," says Duncan. "This was a driving force when we envisioned this scene. It felt very prehistoric." Even so, the tundra was one of the hardest sets to build. "You'd think it would be easy to design a field of random moss, grass, and rocks," he adds, "but it's all these little clumps of heather that grow in their own chaotic little way as Mother Nature intended. To make this uncluttered tundra feel real and not CG was a challenge." Lautrette credits the surfacing department with getting the look just right. "Creating moss that grows on rocks and into plants is definitely a lot more subtle than working on, say, a skyscraper," he says. Surfacing's achievement came via the use of displacement (adding dimension and depth to an object) and the use of grooming and shading tools.

1 • ARTHUR FONG   2 • LEIGHTON HICKMAN



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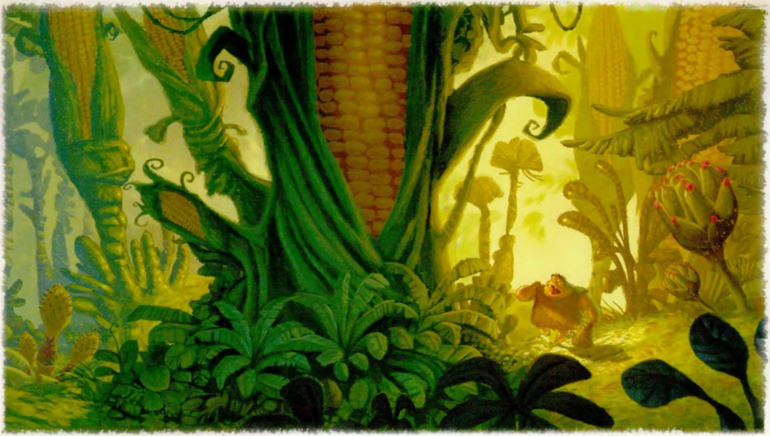
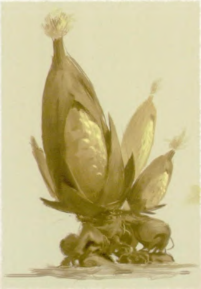


1

When the Croods become fascinated with the fire that saved them from the Piranhakeets, things get a little out of control, to say the least. Before long, the tundra is in flames. This development in the story presented a new challenge for the art department, which found itself in the position of having to "burn" one of their pre-existing sets, since when they created the tundra landscape, they had no way of knowing the story would evolve to include a fire. "This was a case where the story dictated something new," says Lautrette. "We had to create a burned tundra, complete with scorched trees, smoke, and ashes."

One of the early pieces of development art that the filmmakers took a particular liking to, because of its scale, was of a giant ear of corn. "For the longest time, it didn't have a specific place in the film and we tried to make it fit in every sequence," recalls production manager Jed Schlanger with a laugh. Positioning it in a giant cornfield on the edge of the tundra made a lot of sense – and made for some explosive results. Set on fire along with so much else in the expanse, it becomes a speeding rocket that heads for the sky and bursts into colorful fireworks. What goes up must come down, of course. Popcorn, anyone?



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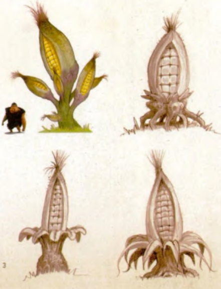

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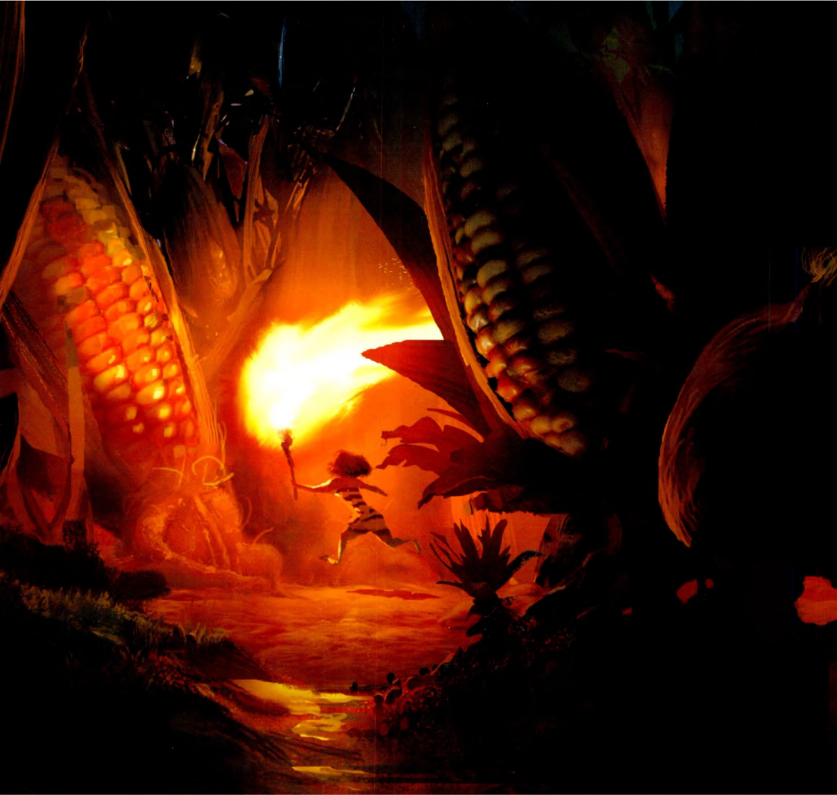
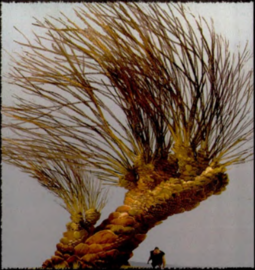
Opposite Page:
MICHAEL YAMADA

1 • BILL KAUFMANN & CHRISTOPHE LAUTRETTE
2 • MICHAEL YAMADA 3 • NICOLAS WEIS





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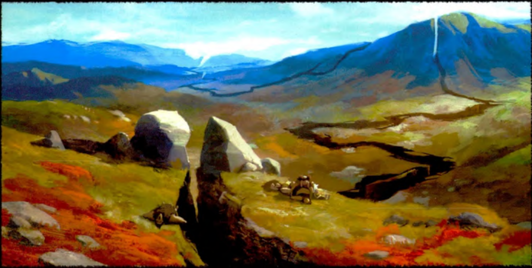

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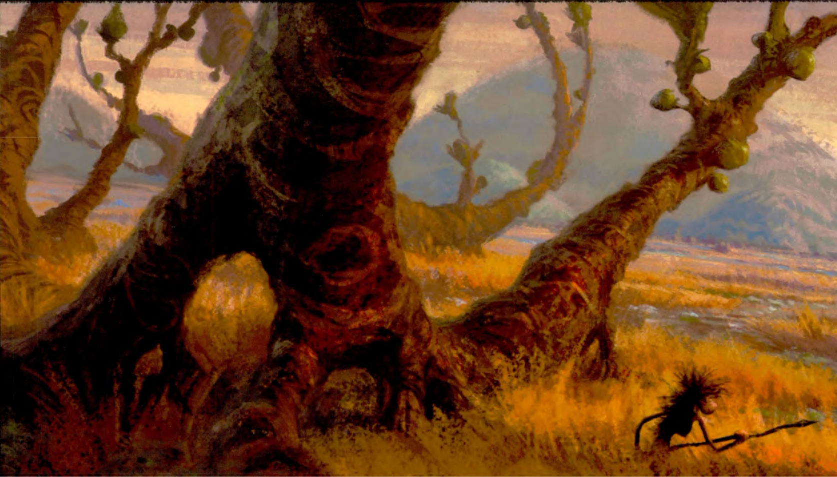

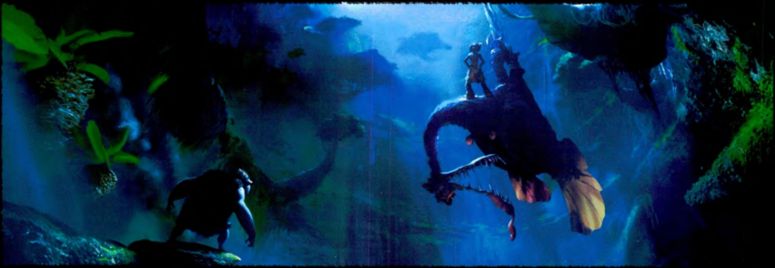

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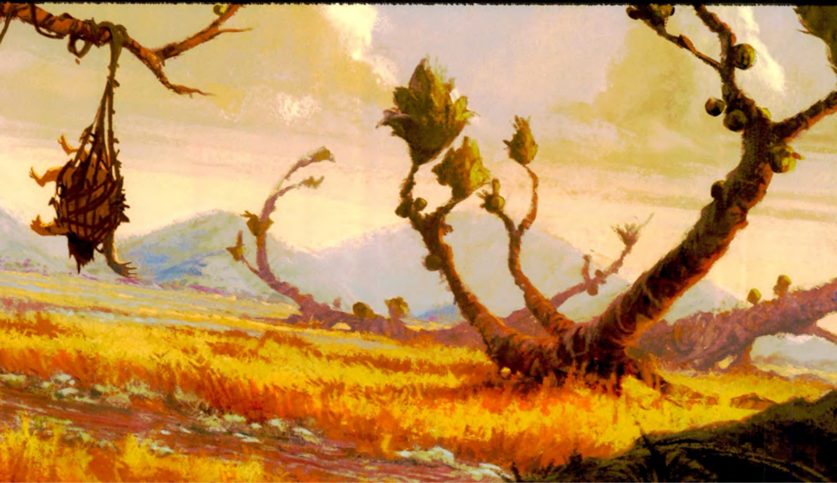

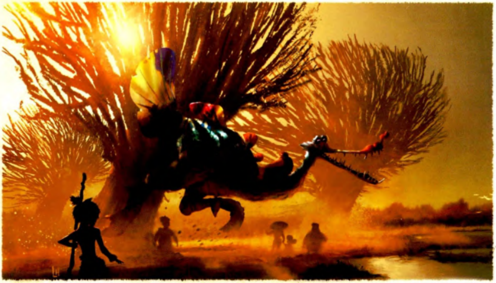

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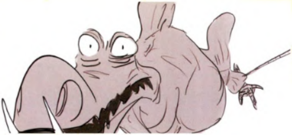

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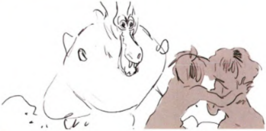

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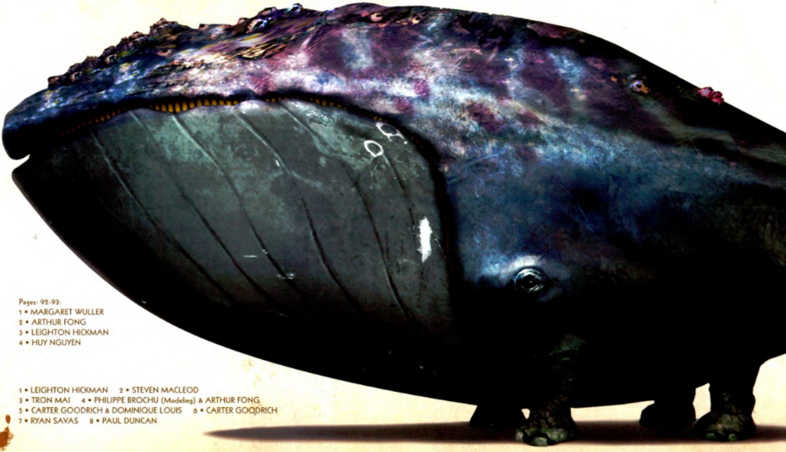

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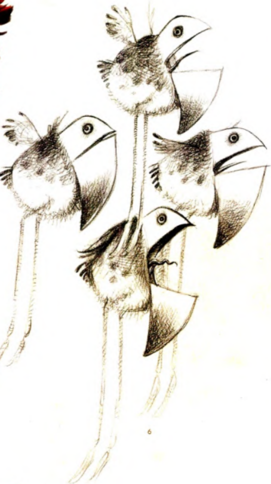
Pages: 92-93:
1 • MARGARET WULLER
2 • ARTHUR FONG
3 • LEIGHTON HICKMAN
4 • HUY NGUYEN

1 • LEIGHTON HICKMAN 2 • STEVEN MACLEOD
3 • TRON MAI 4 • PHILIPPE BROCHU (Modeling) & ARTHUR FONG
5 • CARTER GOODRICH & DOMINIQUE LOUIS 6 • CARTER GOODRICH
7 • RYAN SAVAS 8 • PAUL DUNCAN

5



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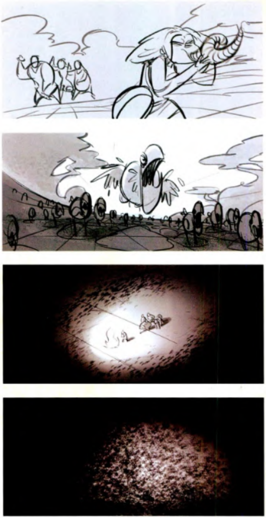

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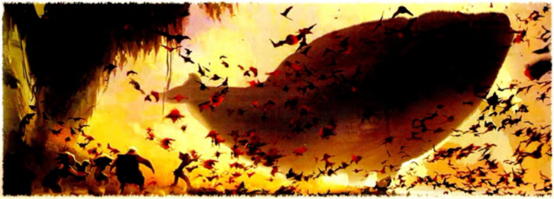
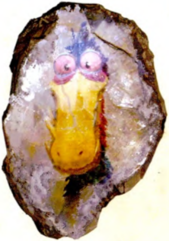


8

THE TURKEYFISH FIELD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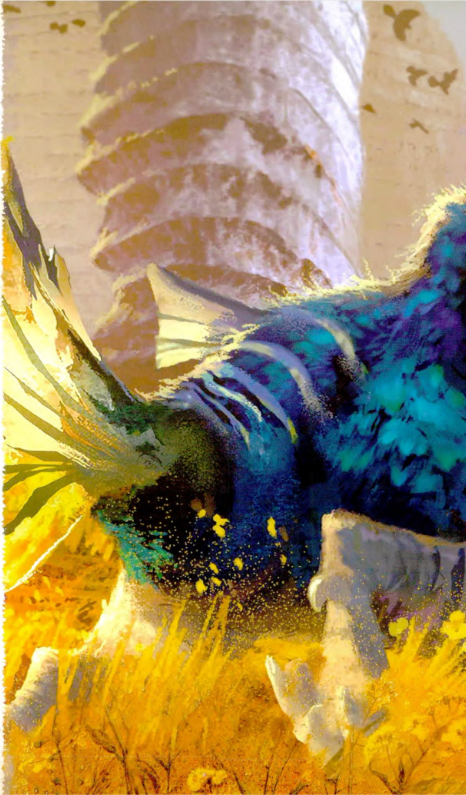
The "are we there yet?" moment of the road trip hits the Croods as they trudge through an immense field of yellow flowers, complaining all the way. Tired and hungry, they're initially unaware that they're traipsing through the hunting domain of the Turkeyfish, a massive, fowl-reptile hybrid. The family doesn't care. They're ready for a meal – and the crossbreed has an egg. The ensuing hunt of the vicious blue bird, Croods style (that is, charging wildly and making lots of noise), doesn't result in a catch. But when Guy sets a trap, one thing leads to another and before you know it, they're eating…Turkeyfish!

Production designer Christophe Lautrette says this scene was characteristic of the directors' vision of the film because it had everything: Oddly shaped structures in the white accordion-like pillars that line the field (influenced first by an ethnic vase design and later by Japanese paper lanterns); bright colored flora (there's the *Oz* influence again); and an improbably appealing (if somewhat crazy) animal taking center stage as it stampedes through the field, more hunter than prey (at least at first). Character designer Shane Prigmore designed the Turkeyfish, which, years before it became a hybrid, was envisioned as a "turkey on steroids."

This sequence is one of Lautrette's favorites because of the contrast of emotions it evokes. "The flower field itself is gentle and sweet. It's somewhere you could envision a romantic moment taking place," he says. "But then we put this annoying animal in the middle of it as well as a tired, bickering family. The light suggests that it's in the late afternoon, either after a storm or before a rain. All together, it makes for a moment that feels a little off-kilter. That's what I like about it."

1 • ARTHUR FONG 2 • HUY NGUYEN & GUILLAUME ARETOS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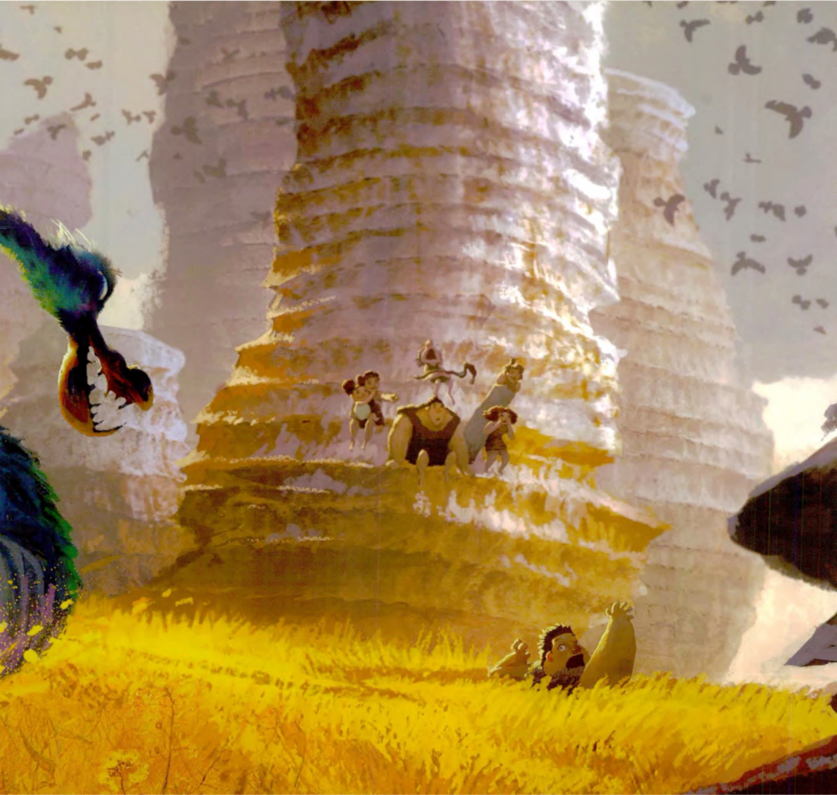
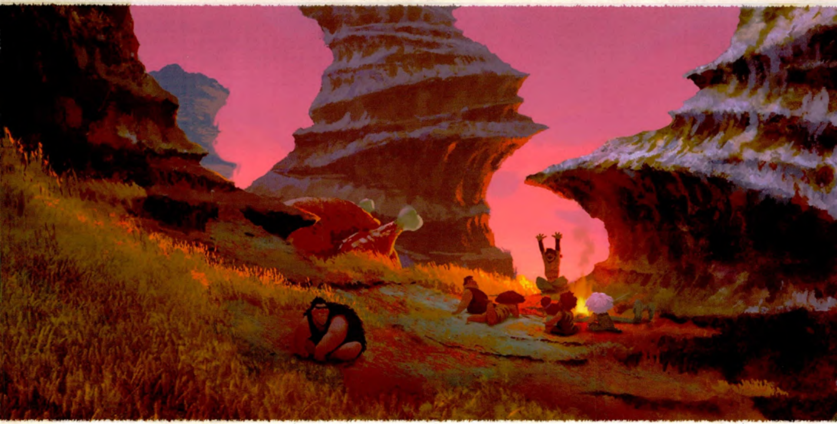
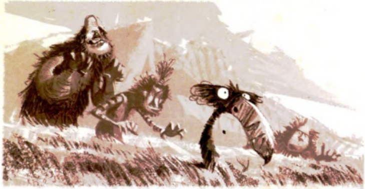


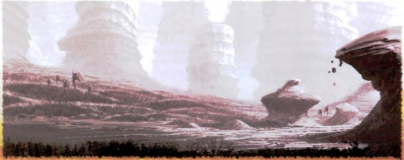




1

"ALL IDEAS WERE WELCOMED. WE HAD AN OPEN DOOR POLICY WITH THE DIRECTORS AND COULD TAKE IDEAS STRAIGHT TO THEM. THIS MADE FOR A VERY COLLABORATIVE EFFORT AND WORKING STYLE."

– PAUL DUNCAN, ART DIRECTOR



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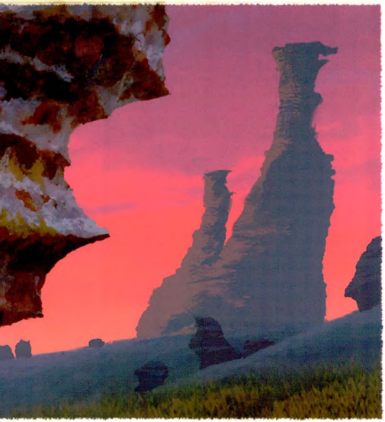
1 • HUY NGUYEN 2 • GUILLAUME ARETOS 3, 5, 6, 7 • ARTHUR FONG 4 • SHANE PRIGMORE



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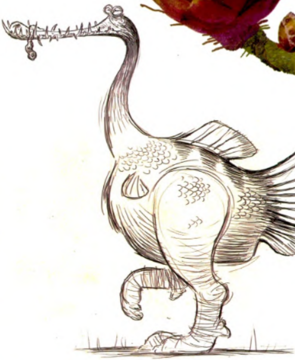

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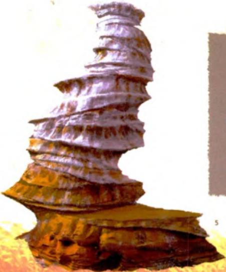

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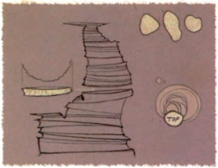

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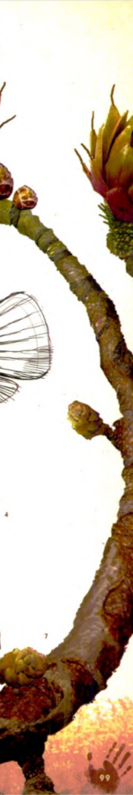

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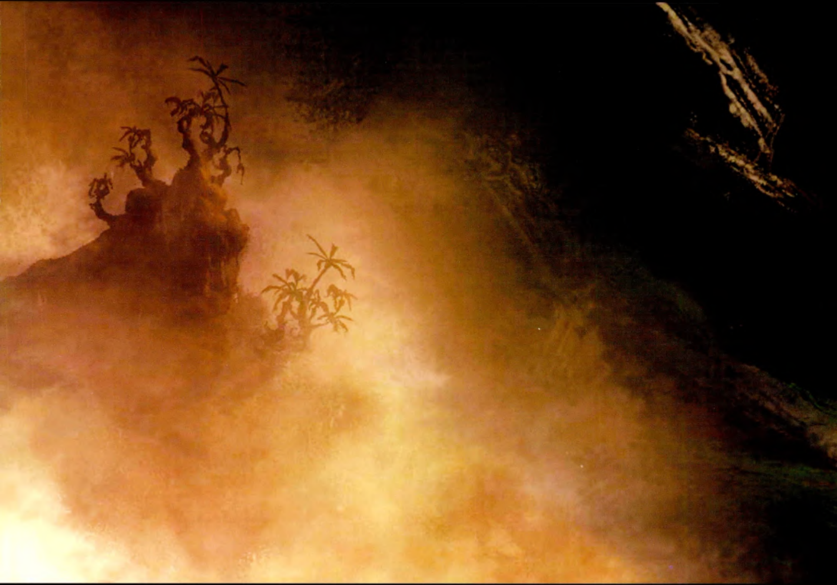
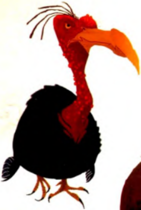


Layout / Color • LEIGHTON HICKMAN



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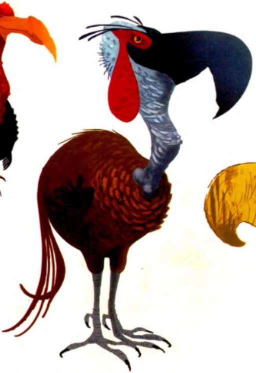

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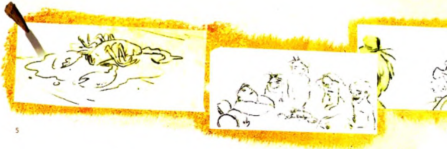

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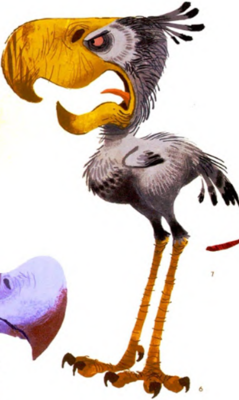
1, 2, 3, 4, 6, 7, 8, 9, 13, 14 • SHANE PRIGMORE
5 • TRON MAI & RYAN SAVAS
10 • TAKAO NOGUCHI & MARGARET WULLER
11 • SHANNON TINDLE
12 • CHRIS SANDERS



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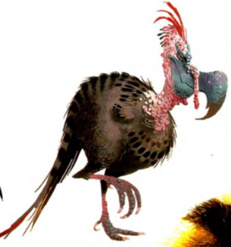

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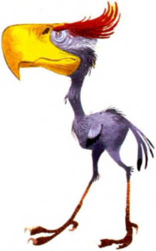

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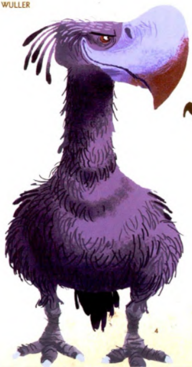

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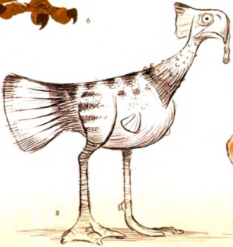

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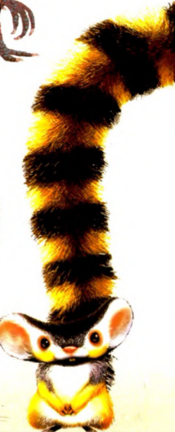

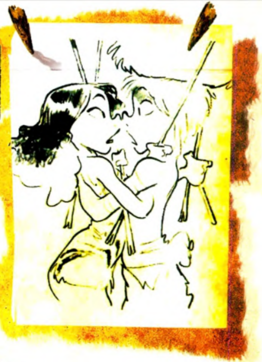

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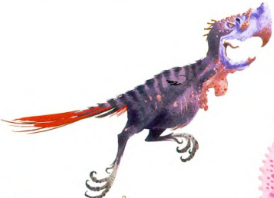

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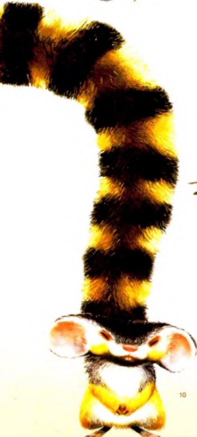

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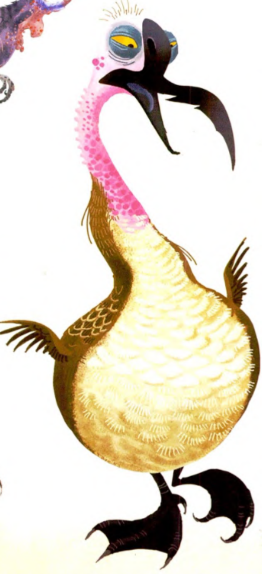

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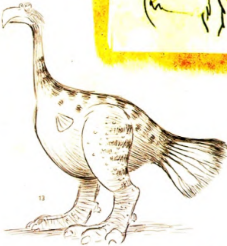

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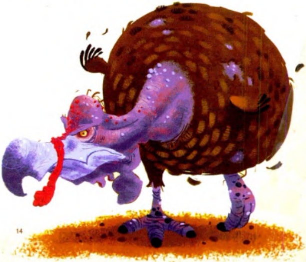

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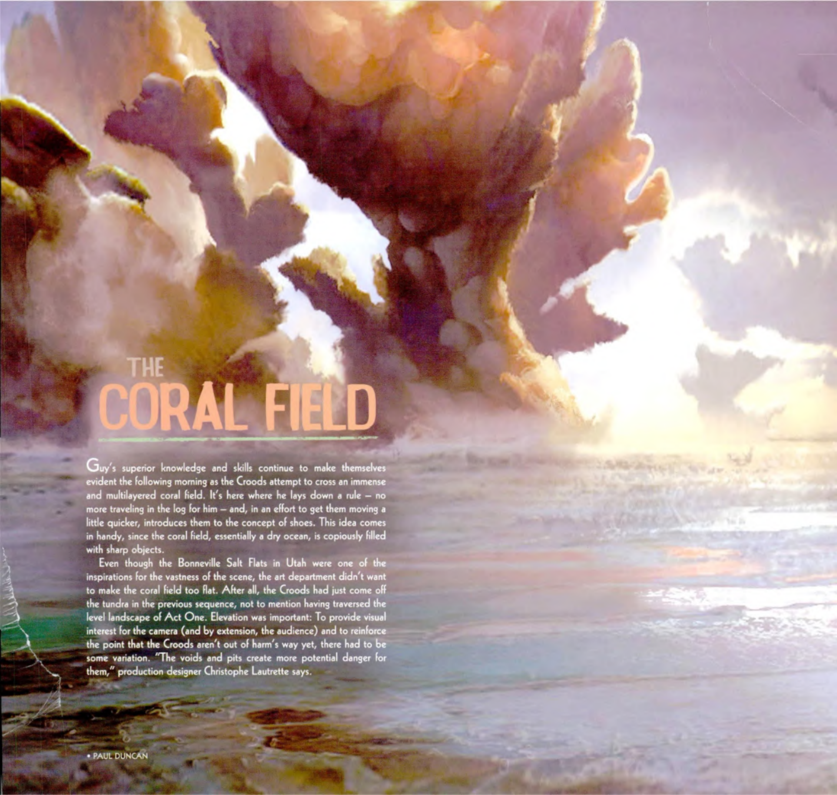


THE CORAL FIELD

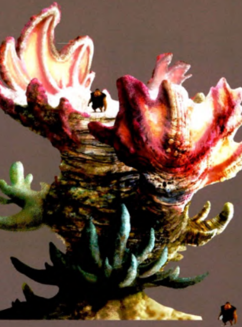
Guy's superior knowledge and skills continue to make themselves evident the following morning as the Croods attempt to cross an immense and multilayered coral field. It's here where he lays down a rule – no more traveling in the log for him – and, in an effort to get them moving a little quicker, introduces them to the concept of shoes. This idea comes in handy, since the coral field, essentially a dry ocean, is copiously filled with sharp objects.

Even though the Bonneville Salt Flats in Utah were one of the inspirations for the vastness of the scene, the art department didn't want to make the coral field too flat. After all, the Croods had just come off the tundra in the previous sequence, not to mention having traversed the level landscape of Act One. Elevation was important: To provide visual interest for the camera (and by extension, the audience) and to reinforce the point that the Croods aren't out of harm's way yet, there had to be some variation. "The voids and pits create more potential danger for them," production designer Christophe Lautrette says.

• PAUL DUNCAN

Art director Paul Duncan's experiences as a scuba diver served as inspiration for the scene as he recalled a vast field of plate coral while swimming in the Fijian Islands. "I'd look up and see this 'coral-city' spread out in front of me," Duncan says. "If you made the coral in *The Croods* too spindly or too top heavy, it wouldn't work. That's where you stay in reality and don't venture into fantasy."

The coral field idea was so out there, it was important for another reason, too. Studio approval of the scene, created well before others that appeared earlier in the film, would be a gauge of its tolerance of the whimsical versus the real and would give the *Croods* artists a measure of carte blanche in creating landscapes. "Thankfully," Lautrette says, "they really embraced the idea and we were able to move on." The Croods moved on, as well, past the coral field and into the gorges.



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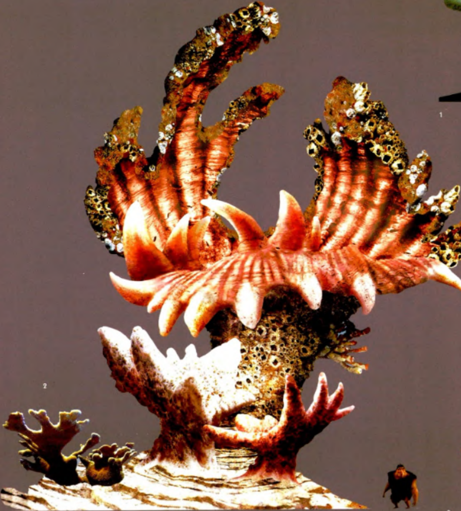

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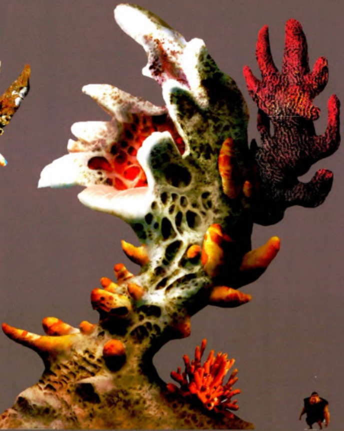

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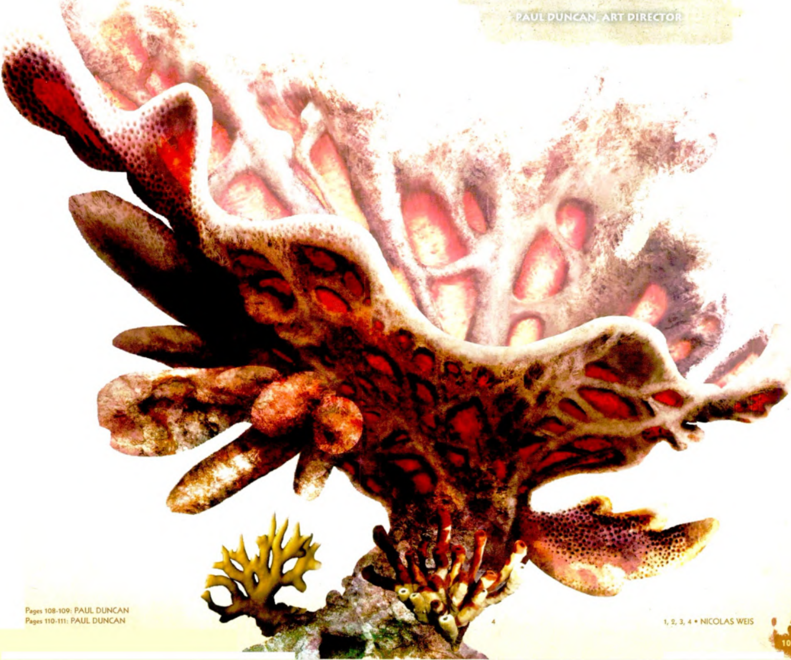
"IF YOU MADE THE CORAL TOO SPINDLY OR TOO TOP HEAVY, IT WOULDN'T WORK. THAT'S WHERE YOU STAY IN REALITY AND DON'T VENTURE INTO FANTASY."

- PAUL DUNCAN, ART DIRECTOR



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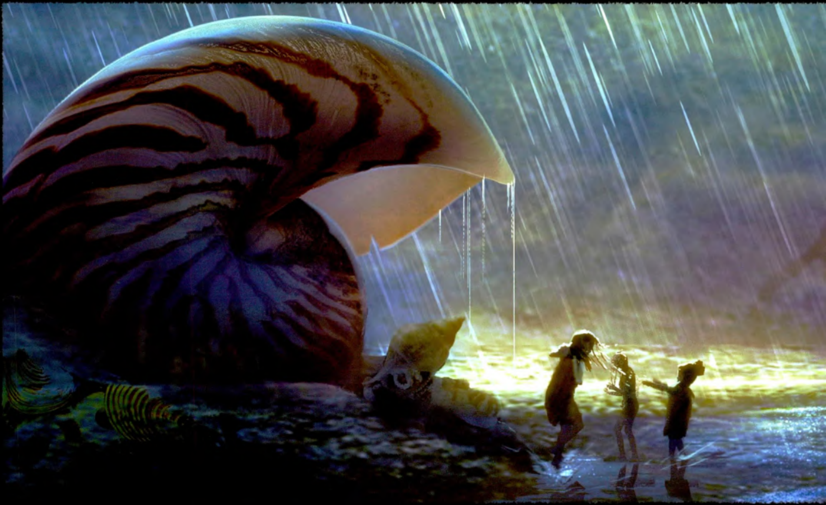
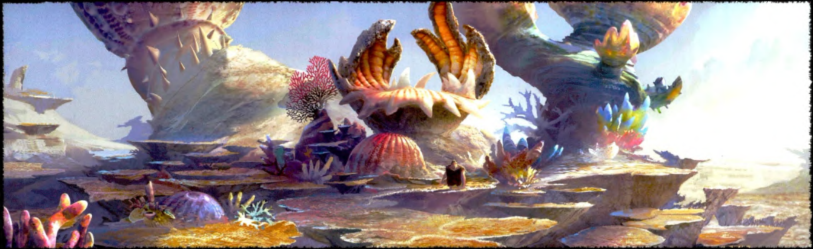
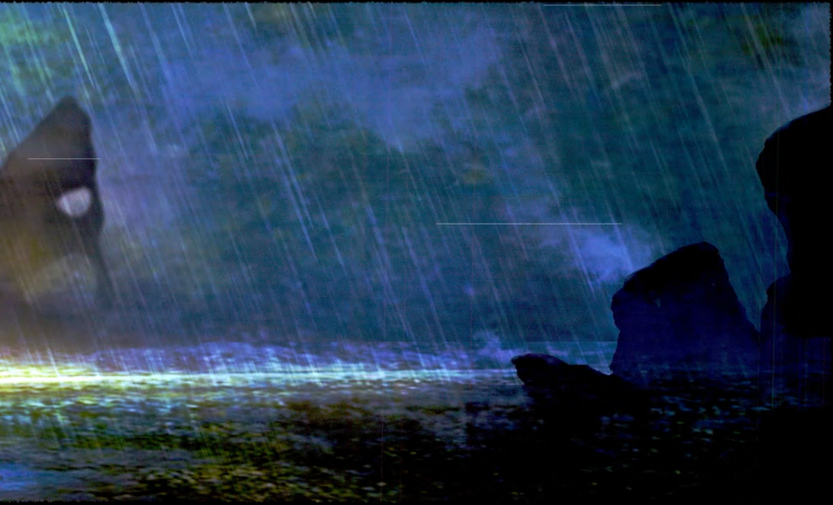
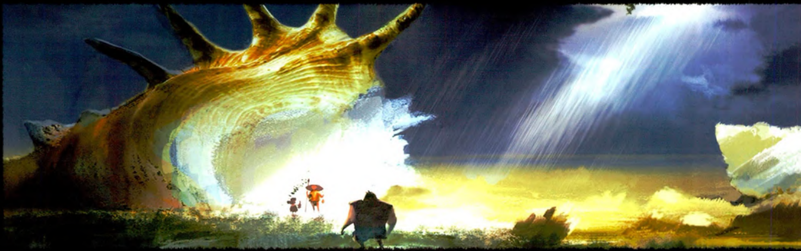
Pages 108-109: PAUL DUNCAN
Pages 110-111: PAUL DUNCAN

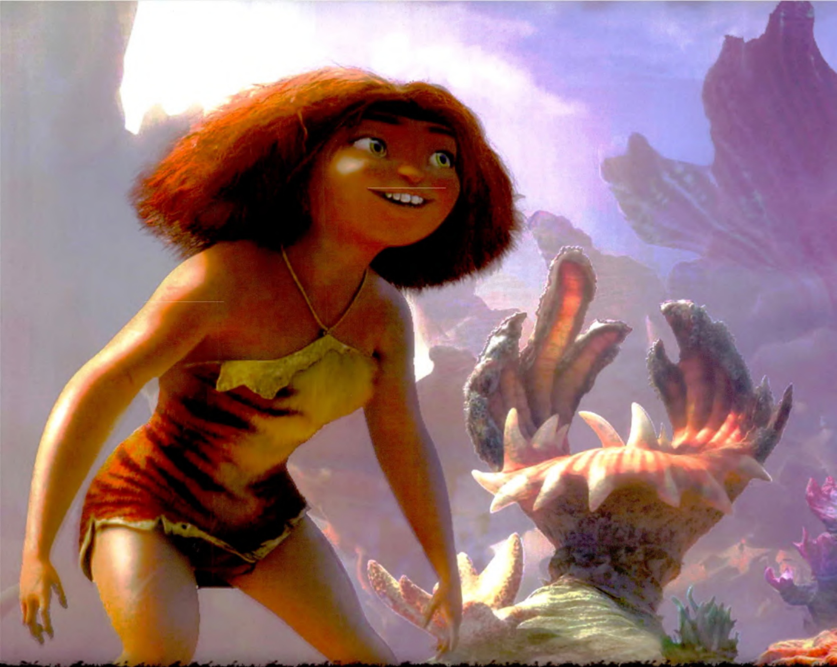
1, 2, 3, 4 • NICOLAS WEIS

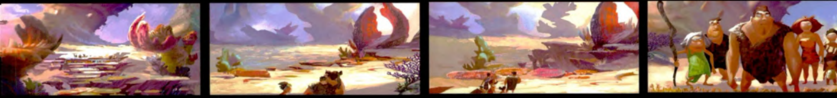


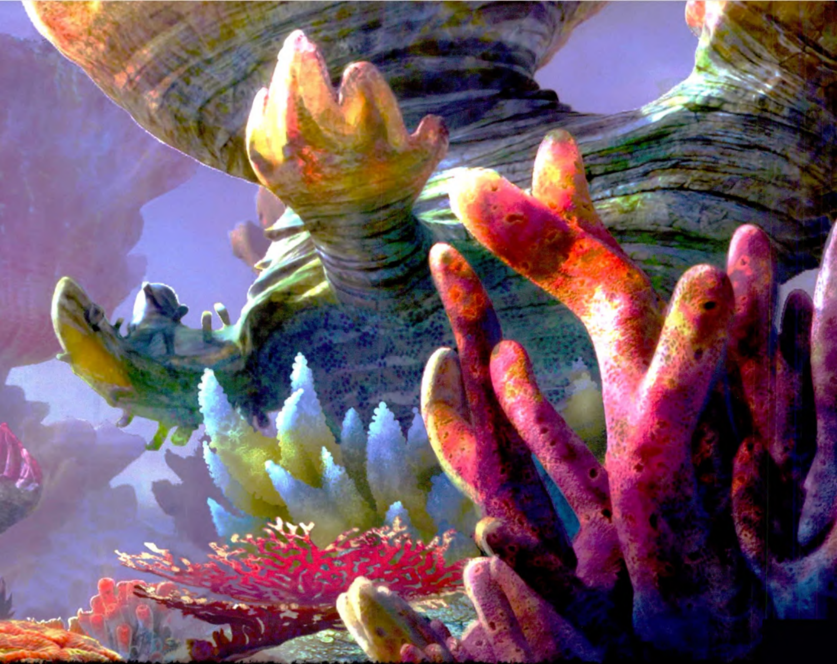


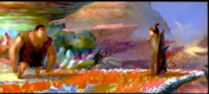


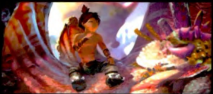


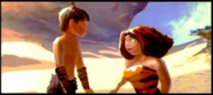


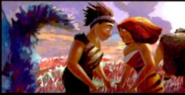










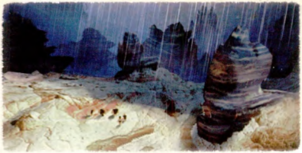


THE GORGES

Everything is supersized in this new world, even rainstorms. Dark clouds form as the Croods negotiate the impressively deep gorges (on stilts and sleds, no less) and within a minute, the sky opens up, drenching the canyon landscape. The downpour causes a crystal-clear lagoon to quickly rise from the ground, presenting the Croods with another opportunity to try something new: Swimming!

It's a playful and colorful scene that highlights the Croods' growing comfort level with their new surroundings – everyone, that is, except for Grug, the lone member of the family who sinks like a rock to the bottom of the pool. "They really start to embrace the world as it is," production designer Christophe Lautrette says. "They're not fighting it all the time."

Despite any similarities, the Grand Canyon was not one of the inspirations for the gorges. Rather, the artists looked to cliffscapes in China, Thailand, Ireland, and France.



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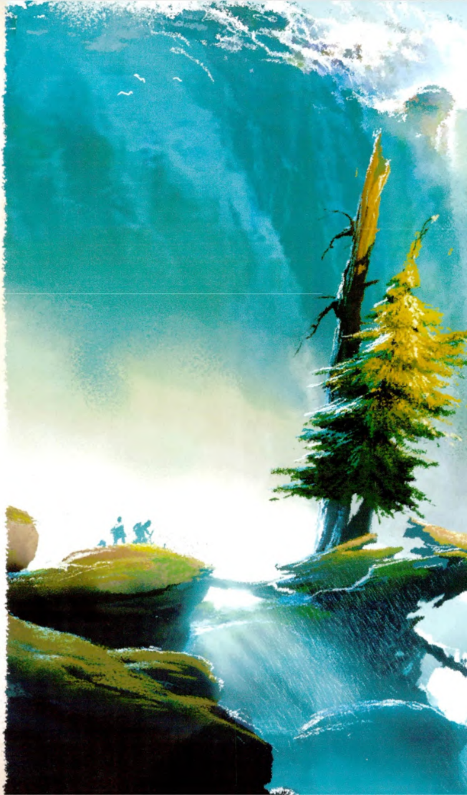
Jeff Hayes and his modeling department were given the opportunity to stretch their creative muscles when Lautrette handed them the concept design for the gorges and asked them to recycle the ground and vegetation from the jungle sequence. "Since we already built the jungle sequence in production, we felt like it wasn't necessary to reinvent all the plants on top of the gorges," Lautrette says. "This wasn't a cut and paste job, of course. They had to be creative and come up with things that surprised us."

"Throughout the movie, we looked for opportunities to not do the expected, but to play scenes against type," notes VFX supervisor Markus Manninen, "and that's what we did here in creating a happy sequence in the rain. It was essential that the lighting support the storytelling."

Joining Grug in the water is a Fish-Cat, a creature character designer Takao Noguchi designed early in development, which found a home in this scene. "The Croods play with him like a dolphin," Lautrette says.

At one point in story development, giant mosquitos, later killed by lightning dubbed "the Bug Zapper," were chasing the Croods. The scene was deleted, but the bolt of lightning that marks the beginning of the storm remained.



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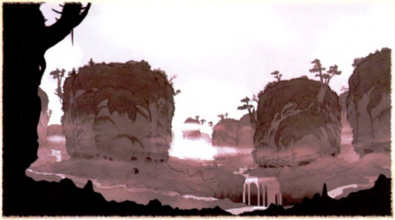
1 • PAUL DUNCAN 2 • EMIL MITEV & DOMINIQUE LOUIS



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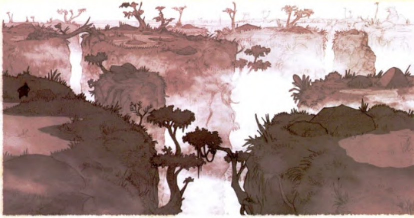

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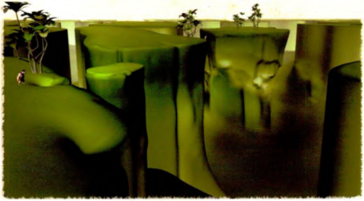

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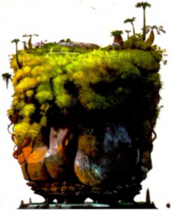
1, 2, 4, 5, 6 • NICOLAS WEIS
3 • BRETT NYSTUL
7, 8 • PAUL DUNCAN

Pages 116-117:
1, 3, 5 • SIMON RODGERS
2, 4.• DOMINIQUE LOUIS



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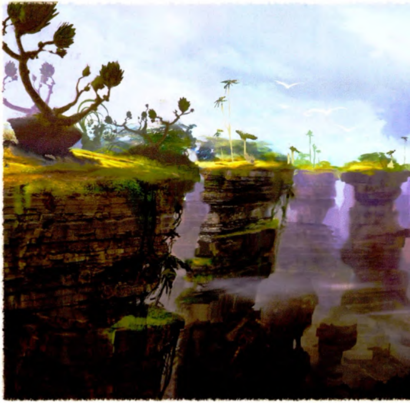

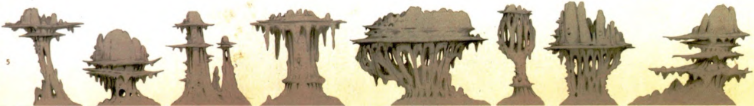

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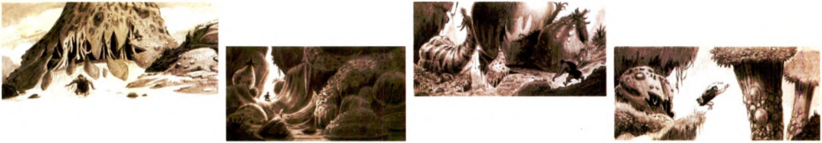

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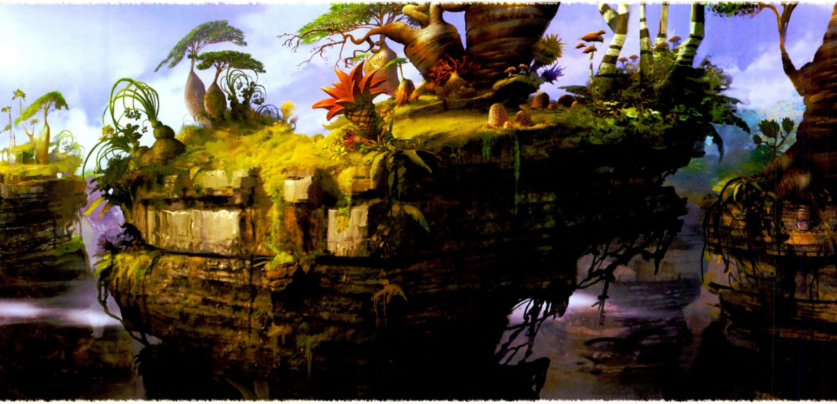

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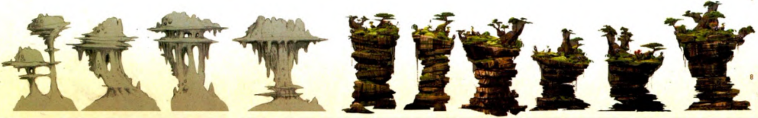

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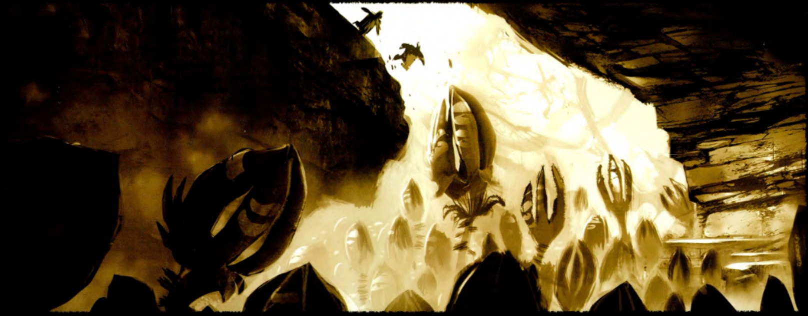

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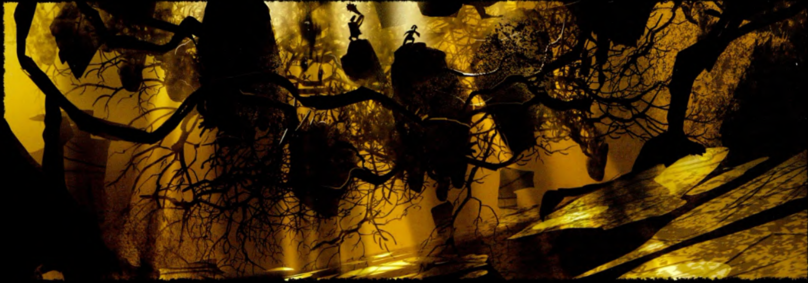

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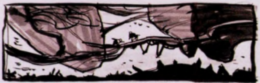

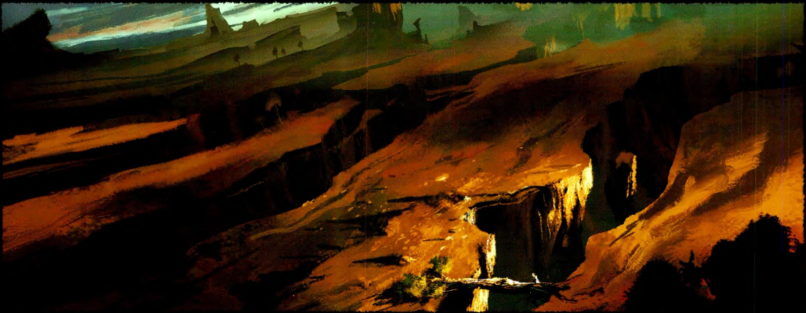

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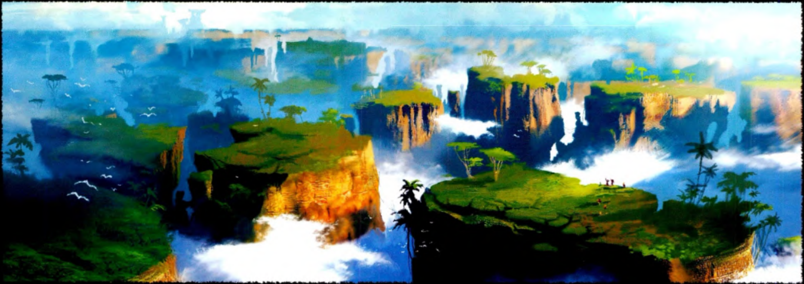

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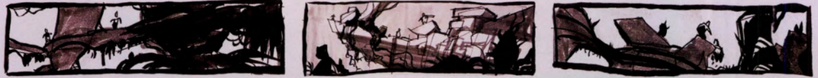

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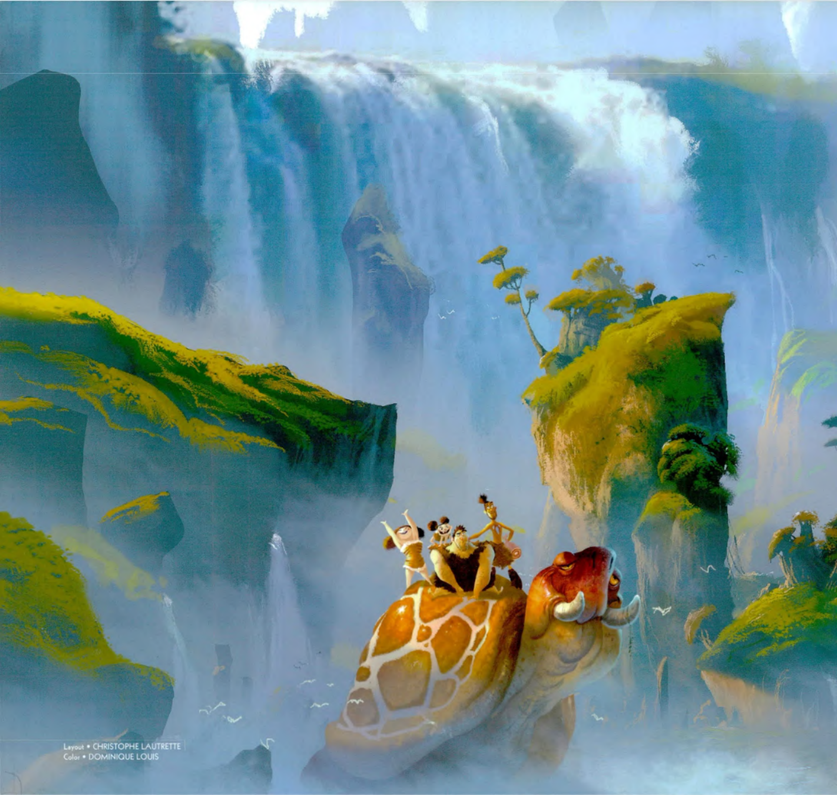
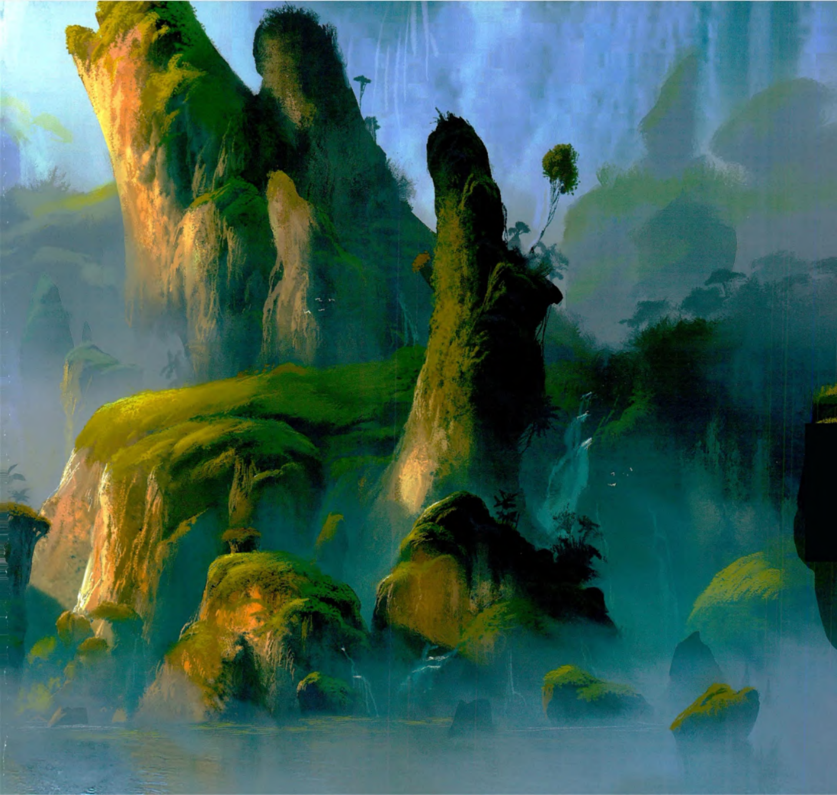
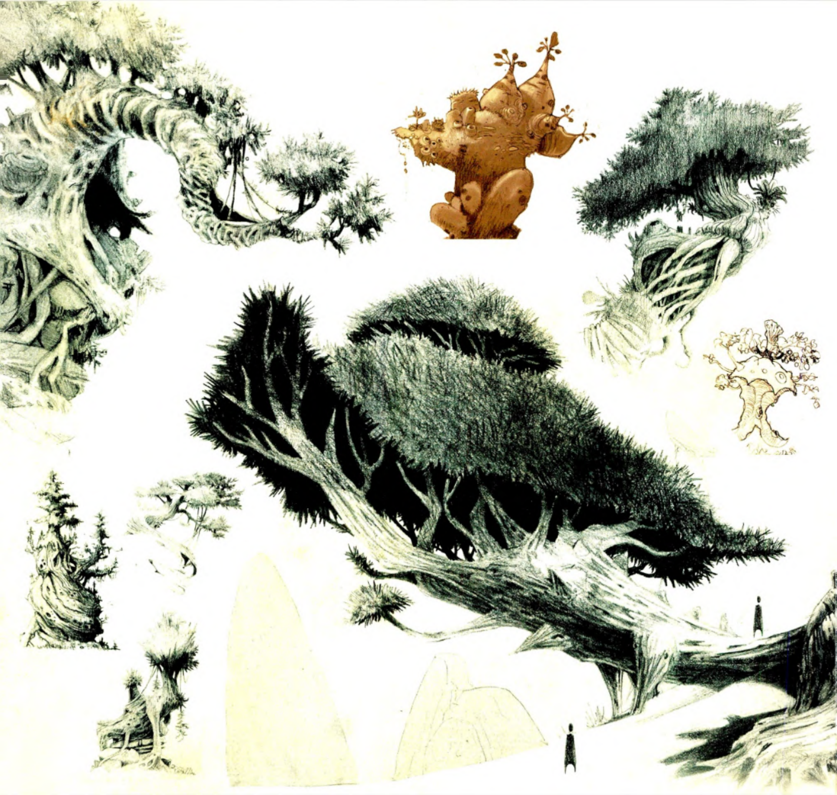
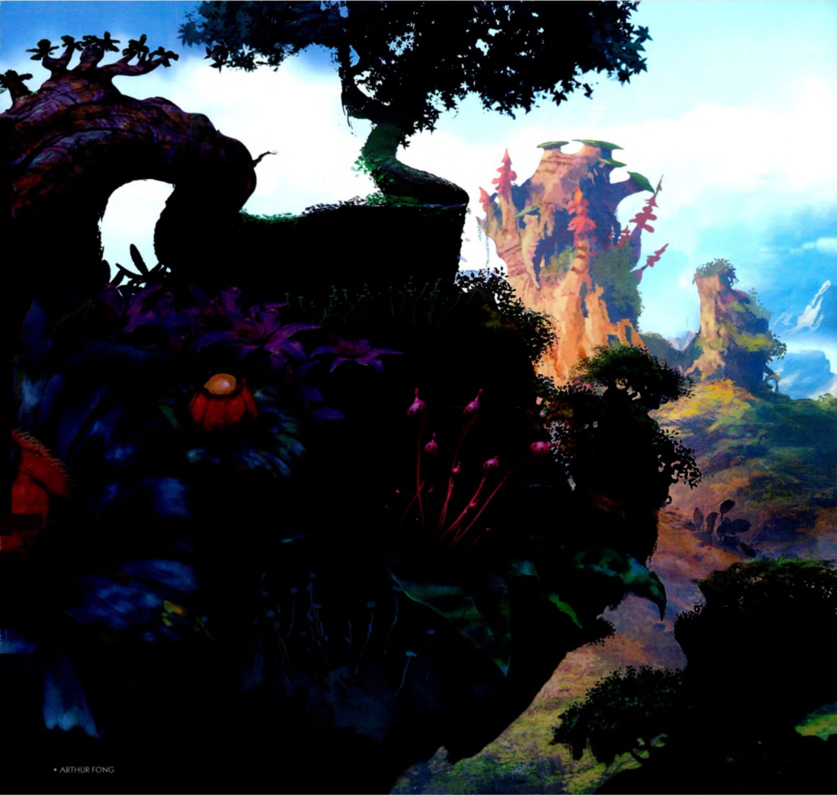


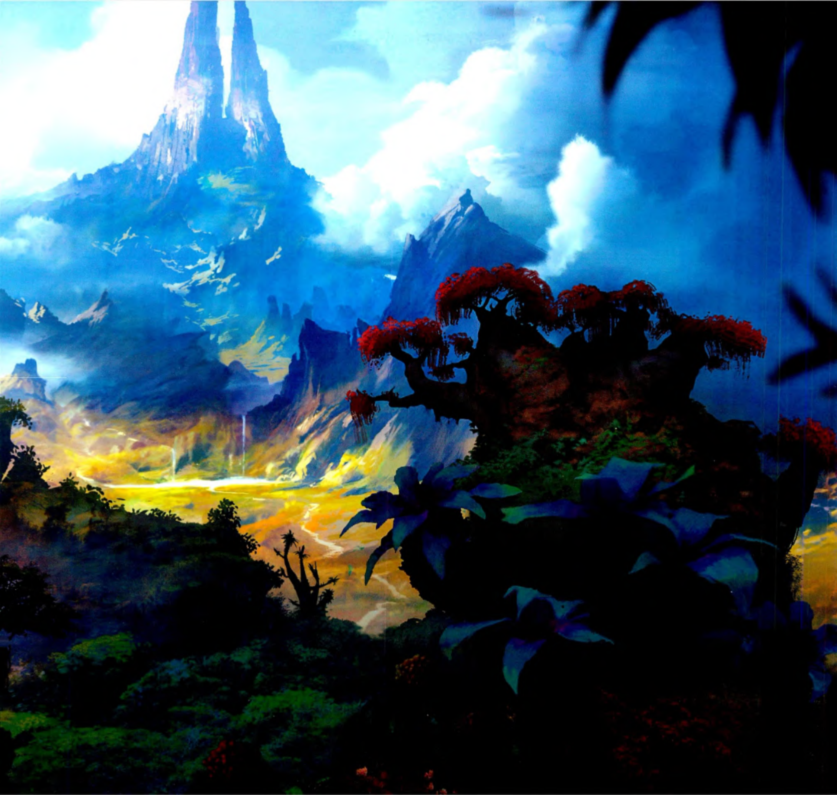
Layout • CHRISTOPHE LAUTRETTE
Color • DOMINIQUE LOUIS

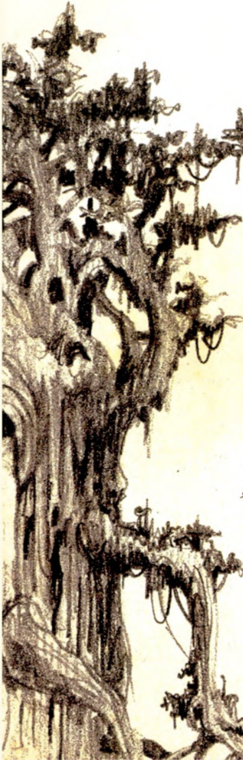


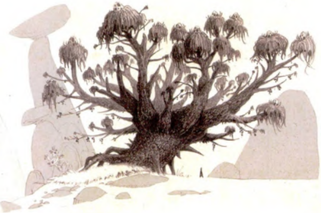


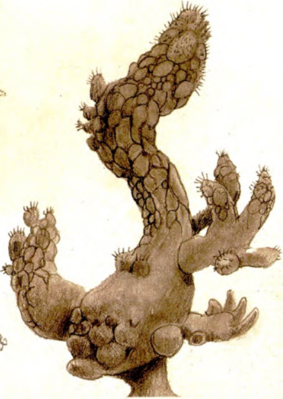


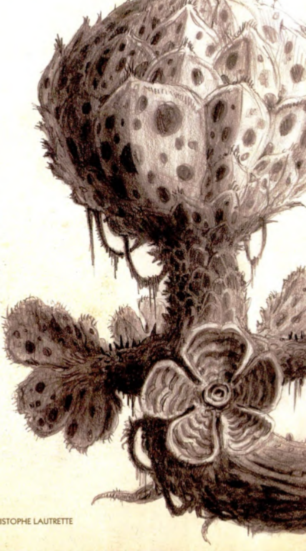
• ARTHUR FONG



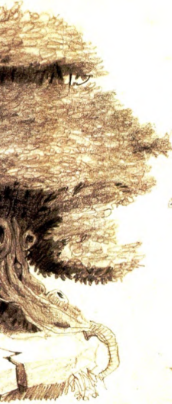


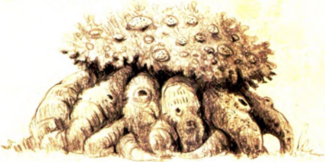
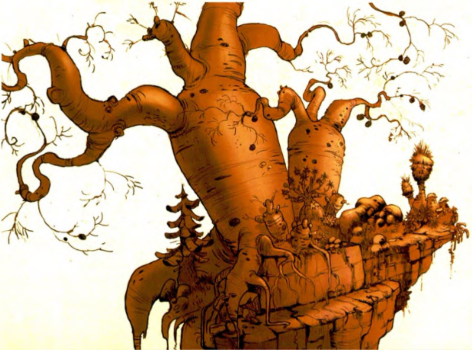
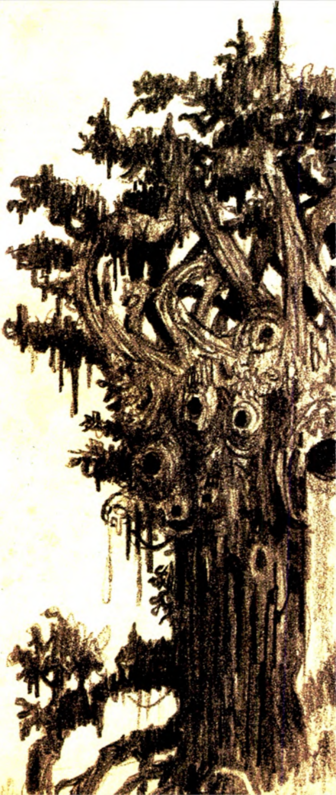






• NICOLAS WEIS • EMIL MITEV • CHRISTOPHE LAUTRETTE



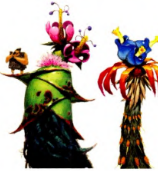




THE MAZE

The Croods are getting nearer to the mountain. Standing in their way, however, is an enormous maze with hundreds of openings. Navigating through it means getting that much closer to Tomorrow, but at what cost? Grug is none too happy about Guy's idea that everyone should take a separate entrance. There's not much he can do about it, though: Just as he's protesting, the earth begins to rumble and they're knocked off their feet into different passageways.

Everyone has a distinct experience. Ugga and Gran encounter a garden of giant carnivorous flowers. "At one point, we imagined the flowers giving off an aroma of pheromones that would drug their victims, making it easy for them to be eaten," says production designer Christophe Lautrette. "In the end we changed the idea to Ugga and Gran disguising themselves as flowers to escape danger." Thunk finds a Crocopup that wants nothing more than to be his pet. Eep and Guy are in parallel passageways, and when they converge at one point, the budding couple have their first tender moment. It couldn't happen in a nicer spot: They meet within the maze's Crystal Cave, the walls of which are giant, glistening geodes. "'Let's surround them with gems!'" art director Paul Duncan recalls saying as the team envisioned the scene. "These geodes and precious stones felt like they belonged in the young, unexploited world we were creating. It also gave us a chance to play with cathedral-like light in this most romantic of moments."

Only Grug is alone, going in circles instead of moving forward. After everyone else has safely emerged on the other side, Ugga has to go back and retrieve her mate. "The scene shows that Grug really cannot manage on his own. He's not sophisticated enough," Lautrette says. "It's the first time you see Grug failing, being disappointed, and accepting defeat." The maze sequence is also the first moment in the film where the family navigates through an event without Grug. It's a symbolic sign of their growing confidence in the new world.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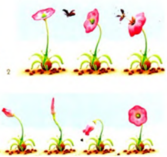
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1 • ARTHUR FONG 2 • MARGARET WULLER & RON KURNIAWAN 3 • TAKAO NOGUCHI

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5 • CHRISTIAN SCHELLEWALD, CHRISTOPHE LAUTRETTE & DOMINIQUE LOUIS
10 • PIERRE-OLIVIER VINCENT & MARGARET WULLER

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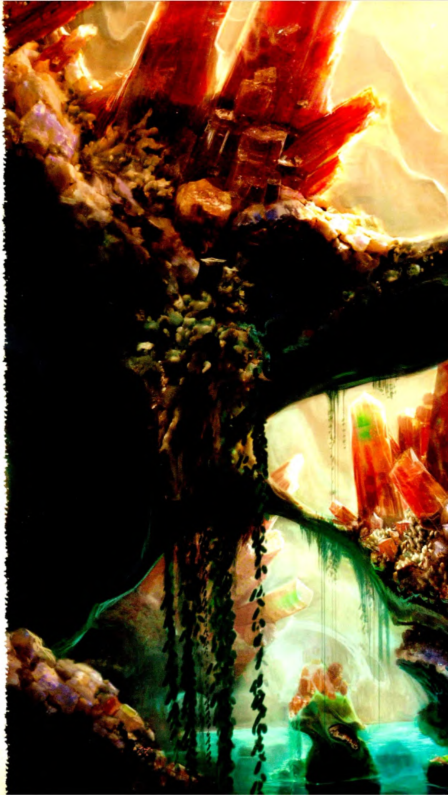

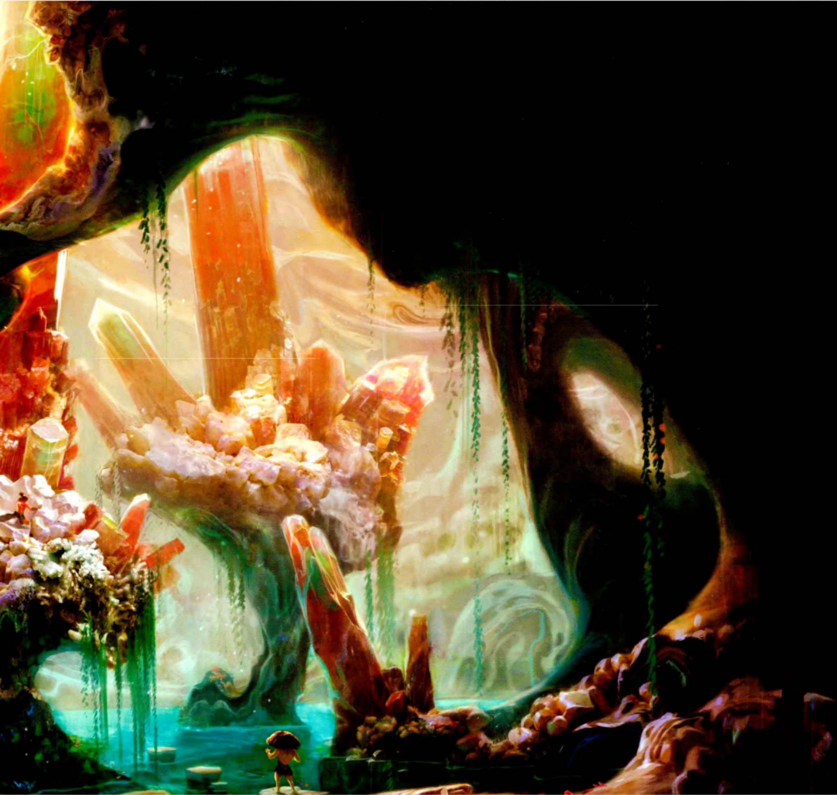

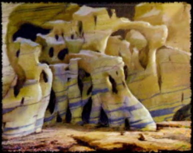

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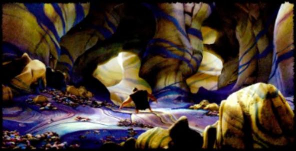

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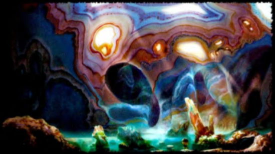

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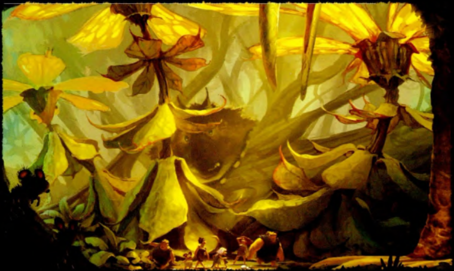

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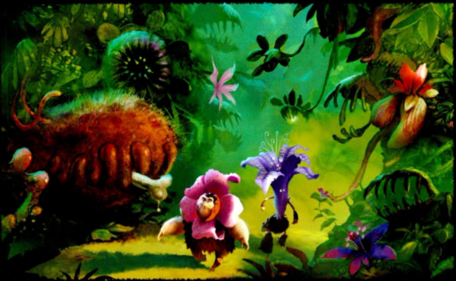

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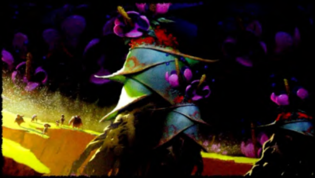

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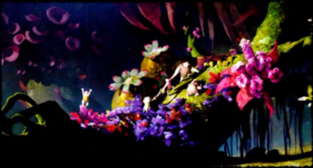

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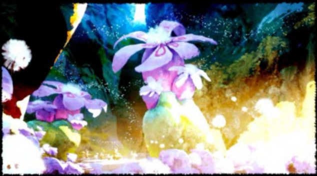

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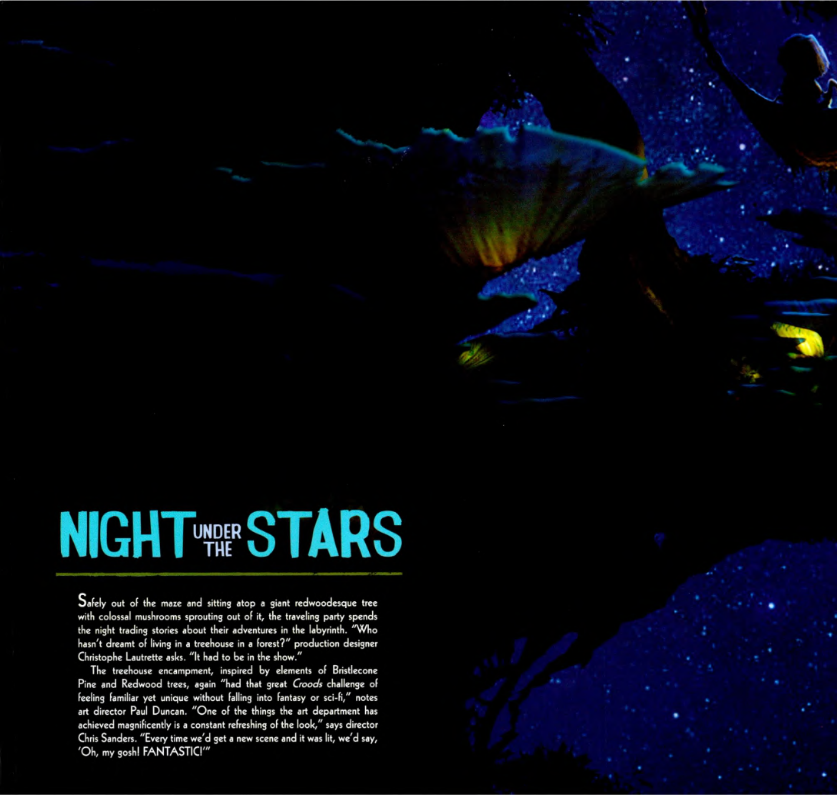
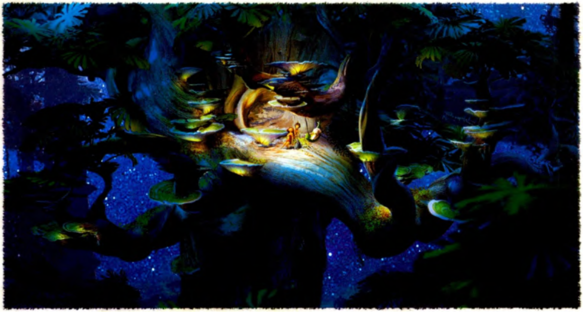


NIGHT UNDER THE STARS

Safely out of the maze and sitting atop a giant redwoodesque tree with colossal mushrooms sprouting out of it, the traveling party spends the night trading stories about their adventures in the labyrinth. "Who hasn't dreamt of living in a treehouse in a forest?" production designer Christophe Lautrette asks. "It had to be in the show."

The treehouse encampment, inspired by elements of Bristlecone Pine and Redwood trees, again "had that great *Croods* challenge of feeling familiar yet unique without falling into fantasy or sci-fi," notes art director Paul Duncan. "One of the things the art department has achieved magnificently is a constant refreshing of the look," says director Chris Sanders. "Every time we'd get a new scene and it was lit, we'd say, 'Oh, my gosh! FANTASTIC!'"



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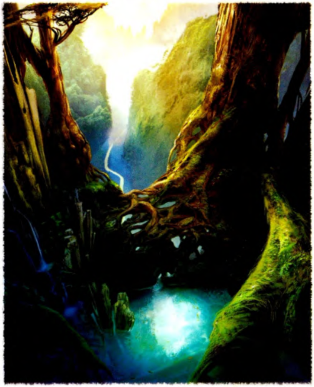

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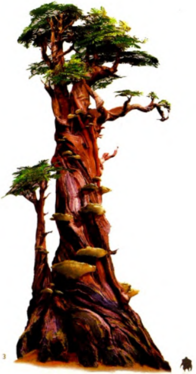

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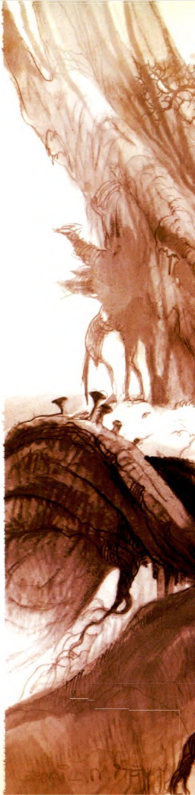

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Pages 130-131: PAUL DUNCAN
Pages 134-135: SIMON RODGERS

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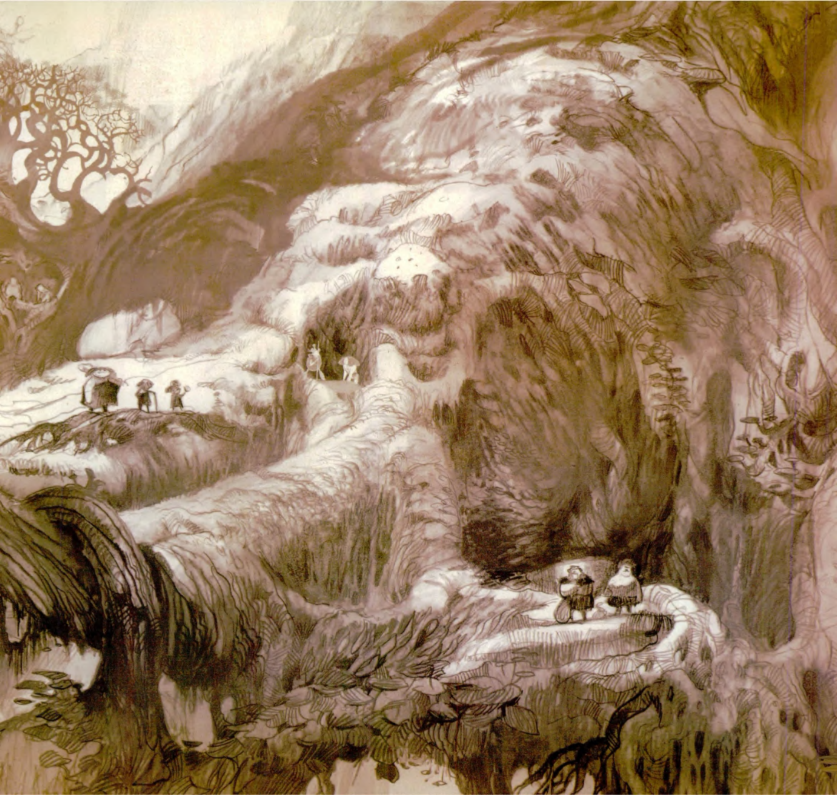
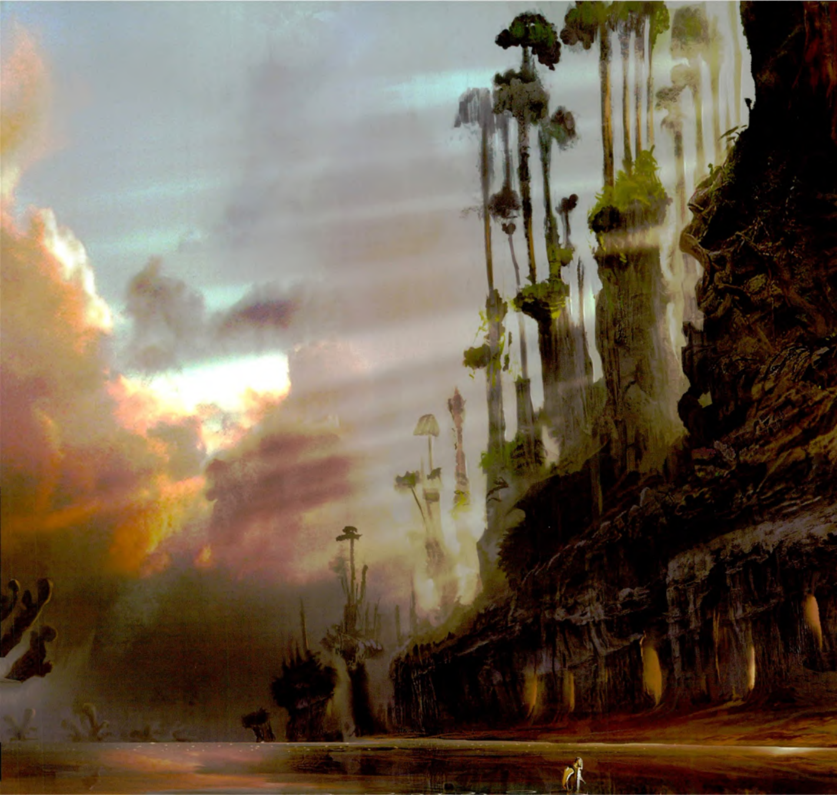
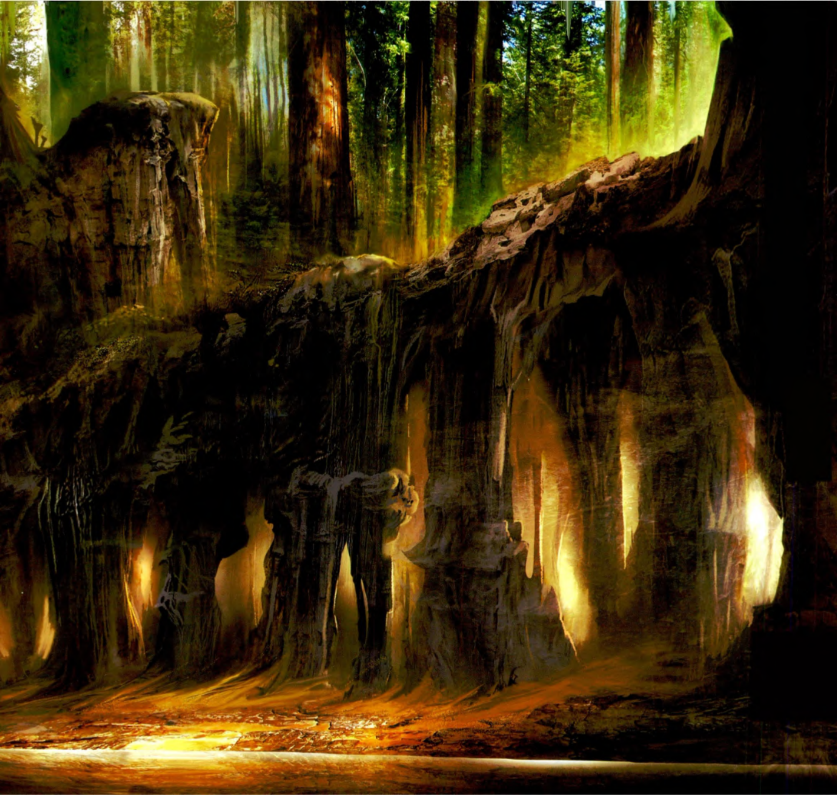
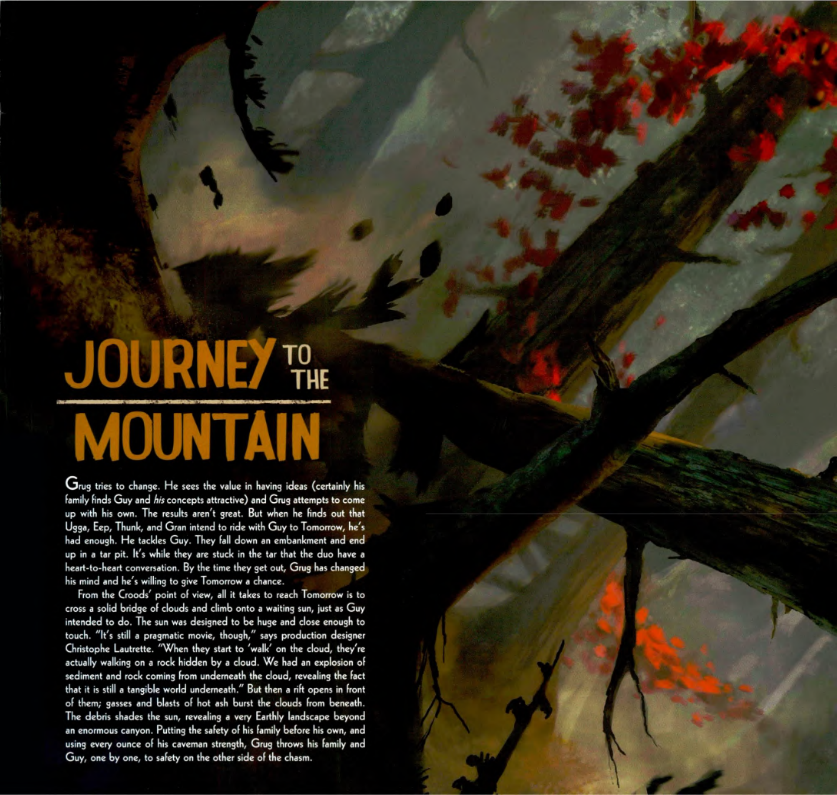
2, 3 • MARGARET WULLER

4 • EMIL MITEV









JOURNEY TO THE MOUNTAIN

Grug tries to change. He sees the value in having ideas (certainly his family finds Guy and *his* concepts attractive) and Grug attempts to come up with his own. The results aren't great. But when he finds out that Ugga, Eep, Thunk, and Gran intend to ride with Guy to Tomorrow, he's had enough. He tackles Guy. They fall down an embankment and end up in a tar pit. It's while they are stuck in the tar that the duo have a heart-to-heart conversation. By the time they get out, Grug has changed his mind and he's willing to give Tomorrow a chance.

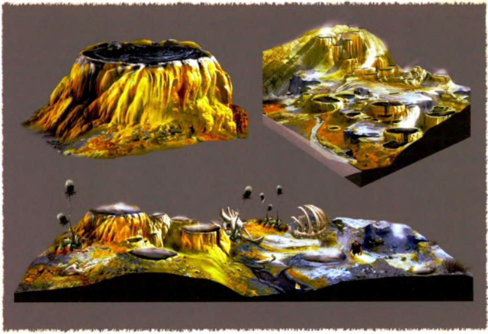
From the Croods' point of view, all it takes to reach Tomorrow is to cross a solid bridge of clouds and climb onto a waiting sun, just as Guy intended to do. The sun was designed to be huge and close enough to touch. "It's still a pragmatic movie, though," says production designer Christophe Lautrette. "When they start to 'walk' on the cloud, they're actually walking on a rock hidden by a cloud. We had an explosion of sediment and rock coming from underneath the cloud, revealing the fact that it is still a tangible world underneath." But then a rift opens in front of them; gasses and blasts of hot ash burst the clouds from beneath. The debris shades the sun, revealing a very Earthly landscape beyond an enormous canyon. Putting the safety of his family before his own, and using every ounce of his caveman strength, Grug throws his family and Guy, one by one, to safety on the other side of the chasm.

Suddenly alone, Grug retreats to the safety of a nearby cave, where one of the most emotional moments of the film takes place. The earth is shaking once again; the end of the world is tangibly near. Illuminated by the fire he has lit for the first time in his life, he paints images of his family and Guy on the walls of the cave, encircled by Grug's big arms. "Grug has an emotional awakening: He cannot do anything without his family," Lautrette says. "Visual development artist Margaret Wuller created this iconic image that has become a logo of sorts for the movie." It's the darkest moment in the film, literally and figuratively, reflecting Grug's state of mind: He is convinced that he's lost his family, and is preparing to die. As the upheaval continues to rage outside, Grug is suddenly startled to discover that he's not alone in the cave. The other occupant is none other than the Macawnivore – who is just as frightened as he is. They make a truce.

Pages 136-137:
MICHAEL YAMADA

Pages 140-141:
ARTHUR FONG

Pages 142-143:
TIANYI HAN



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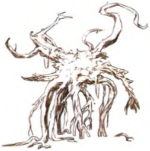
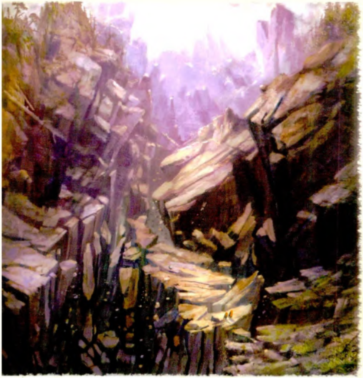
1 • JASON BRUBAKER
2, 5 • MARGARET WULLER
3 • TIANYI HAN
4 • ARTHUR FONG
All images modeled by: MANNY FRAGELUS

1





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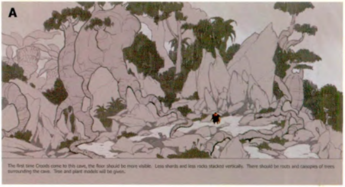
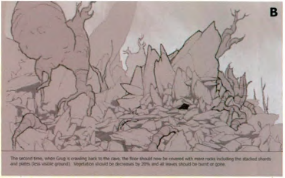


The first time Croods come to this cave, the floor should be more visible. Less shards and less rocks stacked vertically. There should be roots and canopies of trees surrounding the cave. Tree and plant models will be given.



The second time, when Grug is crawling back to the cave, the floor should now be covered with more rocks including the stacked shards and plates (less visible ground). Vegetation should be decreases by 20% and all leaves should be burnt or gone.

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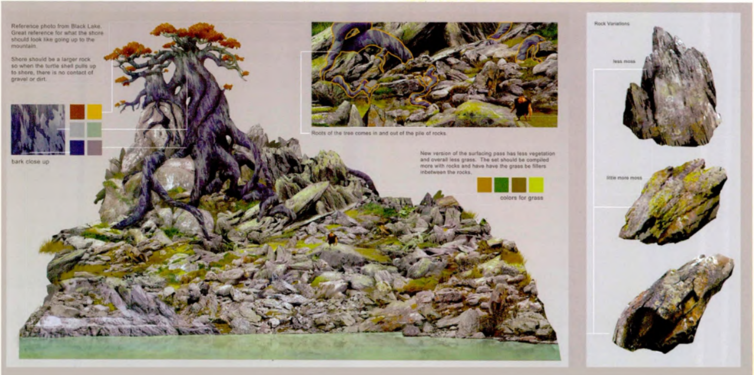

Reference photo from Black Lake. Great reference for what the shore should look like going up to the mountain.

Shore should be a larger rock so when the turtle shell pulls up to shore, there is no contact of gravel or dirt.

Roots of the tree comes in and out of the pile of rocks.

New version of the surfacing pass has less vegetation and overall less grass. The set should be compiled more with rocks and have have the grass be fillers inbetween the rocks.

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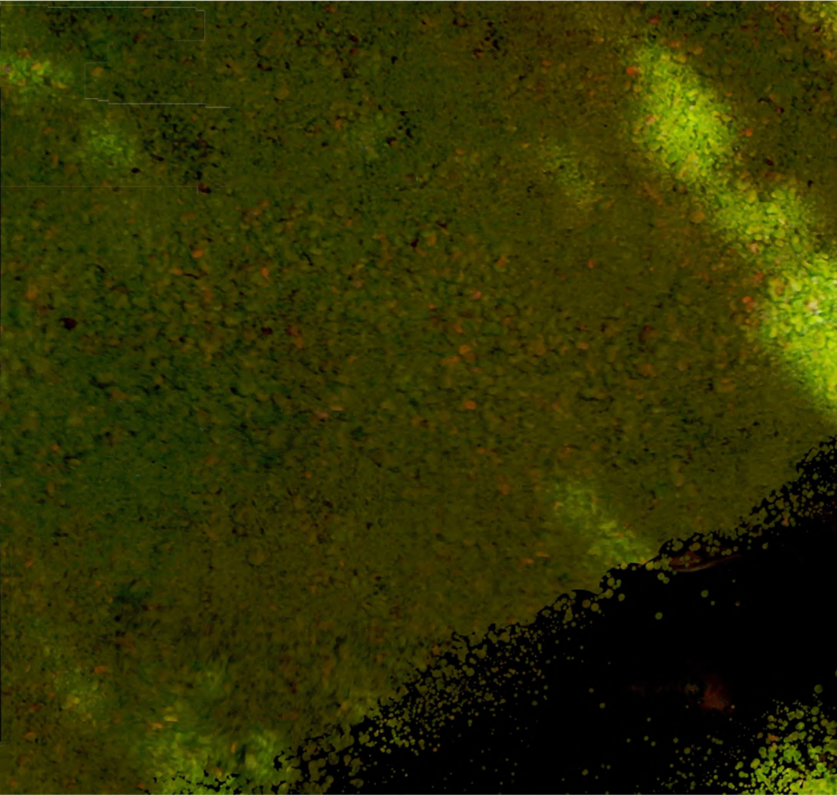
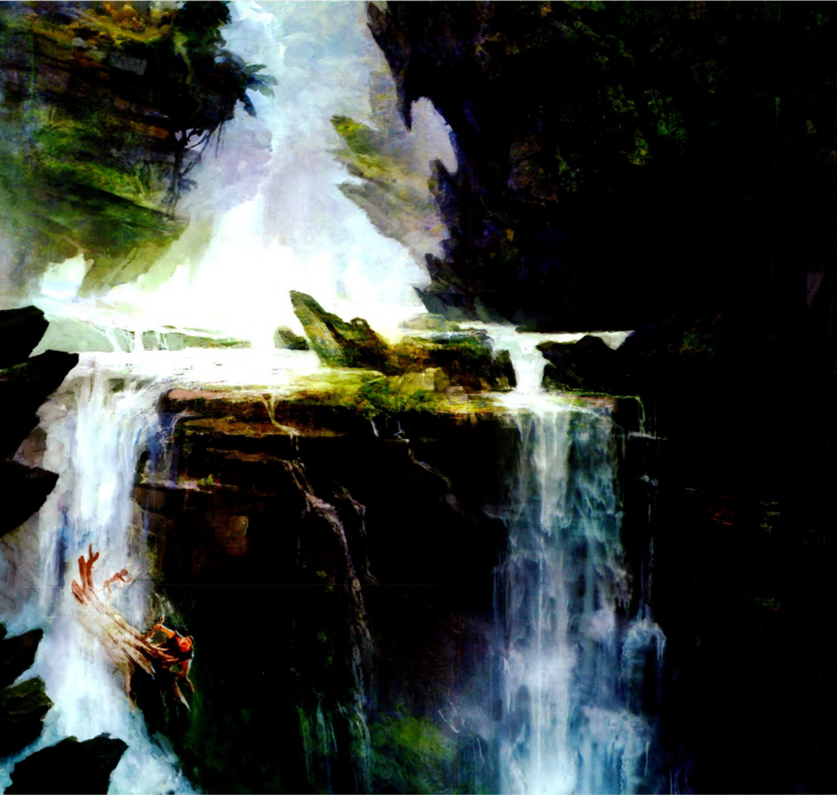
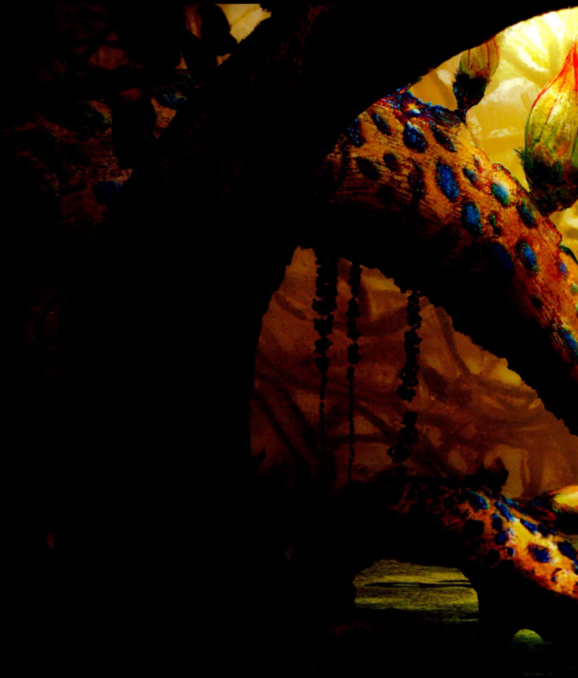
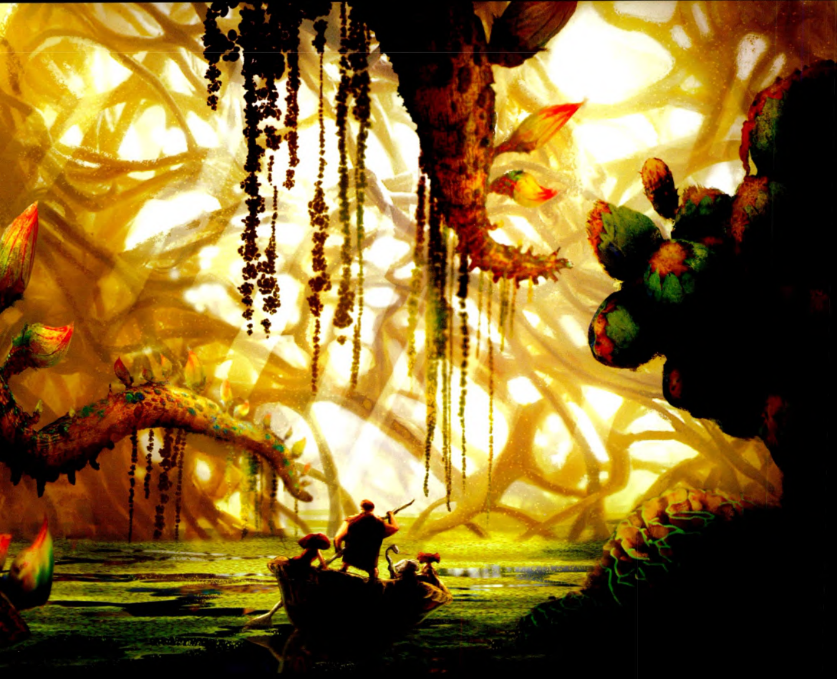






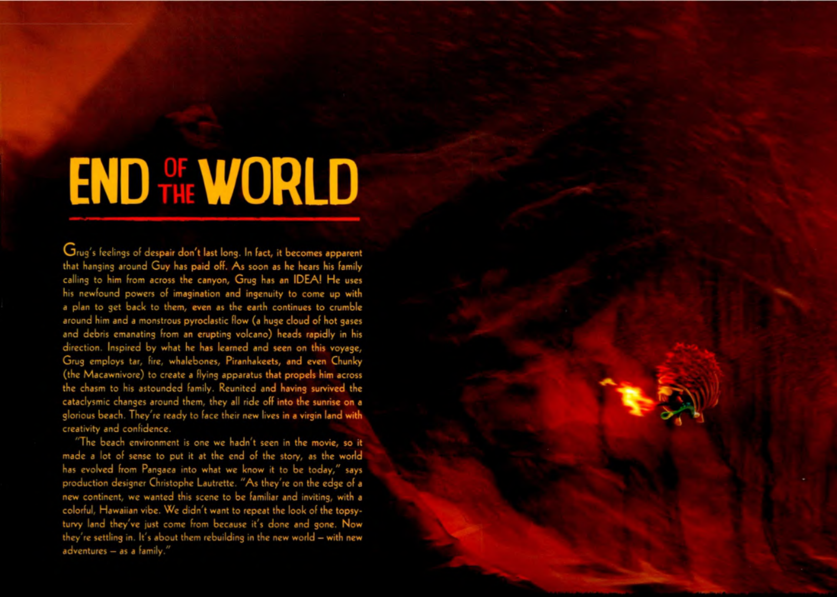
Layout / Color • MARGARET WULLER



END OF THE WORLD

Grug's feelings of despair don't last long. In fact, it becomes apparent that hanging around Guy has paid off. As soon as he hears his family calling to him from across the canyon, Grug has an IDEA! He uses his newfound powers of imagination and ingenuity to come up with a plan to get back to them, even as the earth continues to crumble around him and a monstrous pyroclastic flow (a huge cloud of hot gases and debris emanating from an erupting volcano) heads rapidly in his direction. Inspired by what he has learned and seen on this voyage, Grug employs tar, fire, whalebones, Piranhakeets, and even Chunky (the Macawnivore) to create a flying apparatus that propels him across the chasm to his astounded family. Reunited and having survived the cataclysmic changes around them, they all ride off into the sunrise on a glorious beach. They're ready to face their new lives in a virgin land with creativity and confidence.

"The beach environment is one we hadn't seen in the movie, so it made a lot of sense to put it at the end of the story, as the world has evolved from Pangaea into what we know it to be today," says production designer Christophe Lautrette. "As they're on the edge of a new continent, we wanted this scene to be familiar and inviting, with a colorful, Hawaiian vibe. We didn't want to repeat the look of the topsy-turvy land they've just come from because it's done and gone. Now they're settling in. It's about them rebuilding in the new world – with new adventures – as a family."



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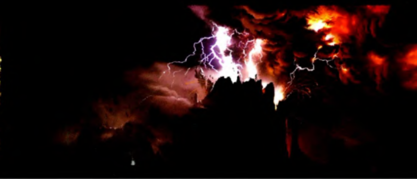

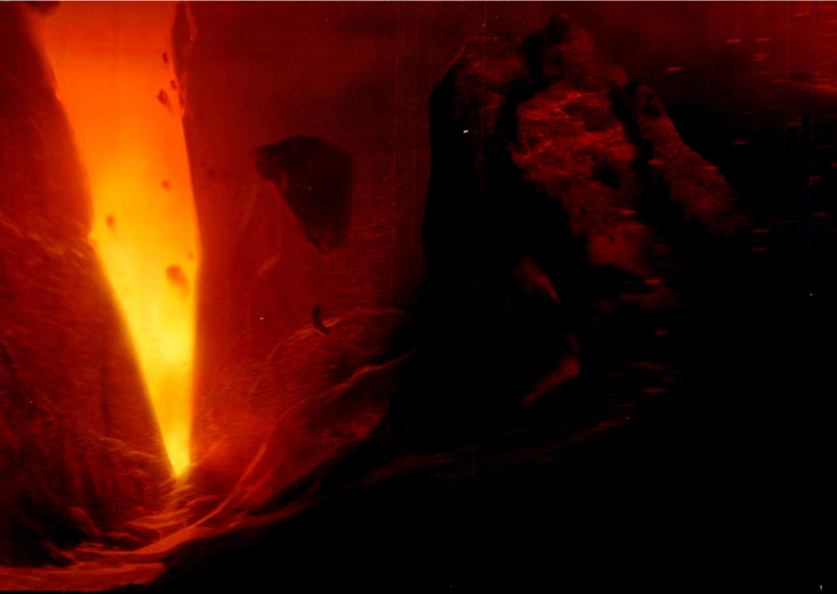

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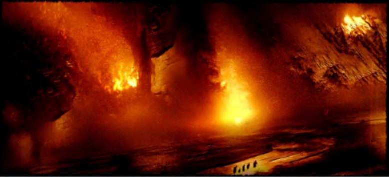

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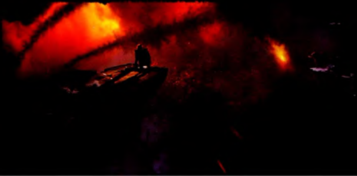

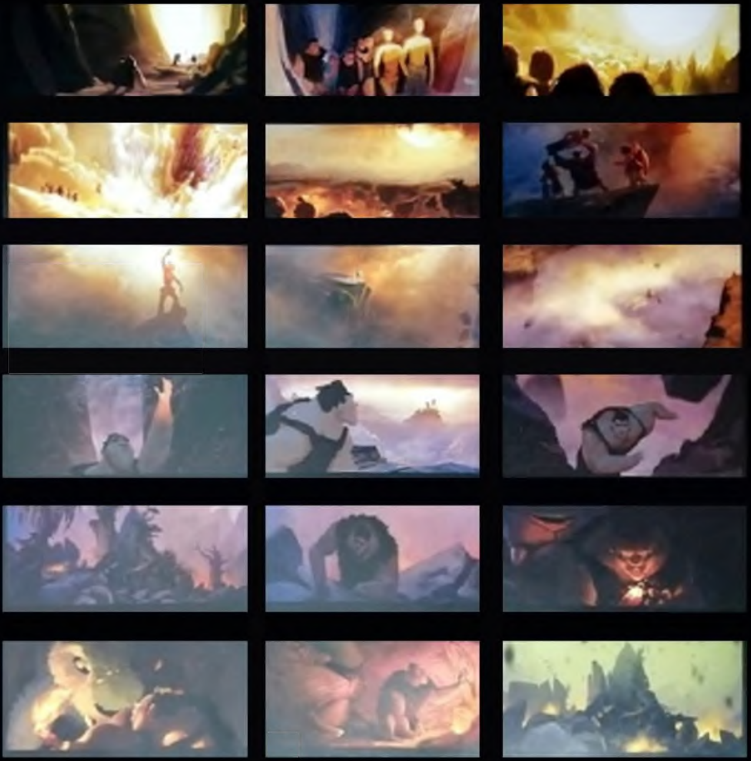

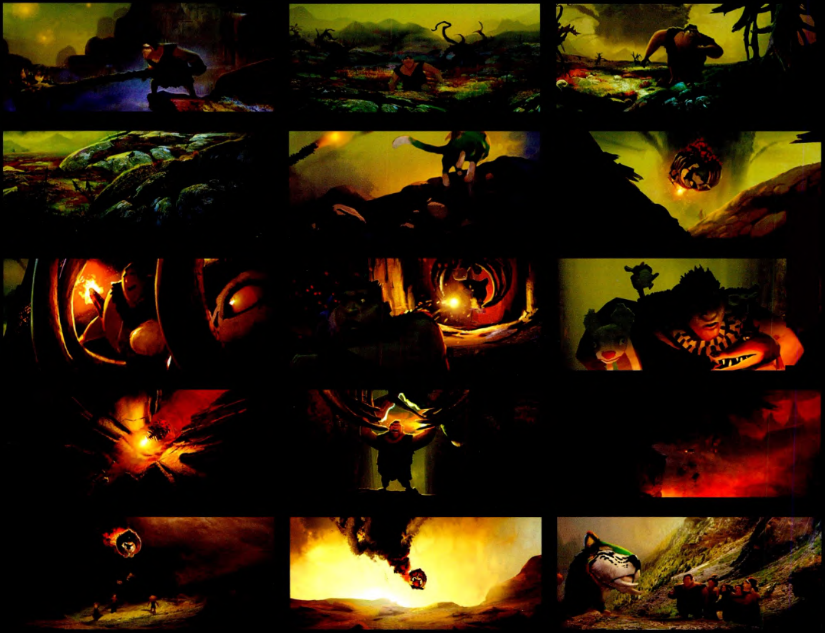

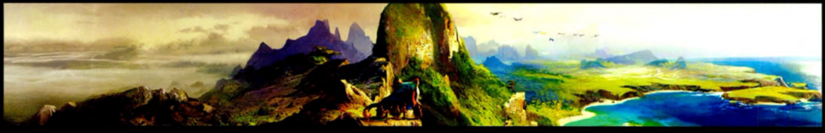

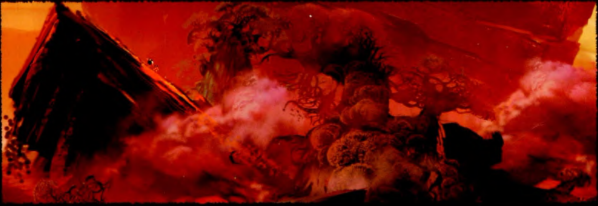

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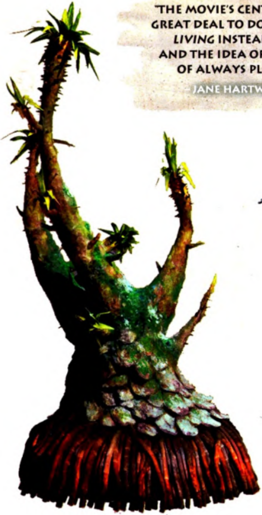
> "THE MOVIE'S CENTRAL THEME HAS A GREAT DEAL TO DO WITH THE IDEA OF *LIVING* INSTEAD OF *SURVIVING* AND THE IDEA OF *RISKING* INSTEAD OF ALWAYS PLAYING IT SAFE."
>
> – JANE HARTWELL, PRODUCER



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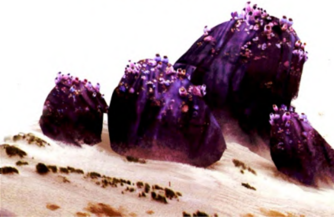

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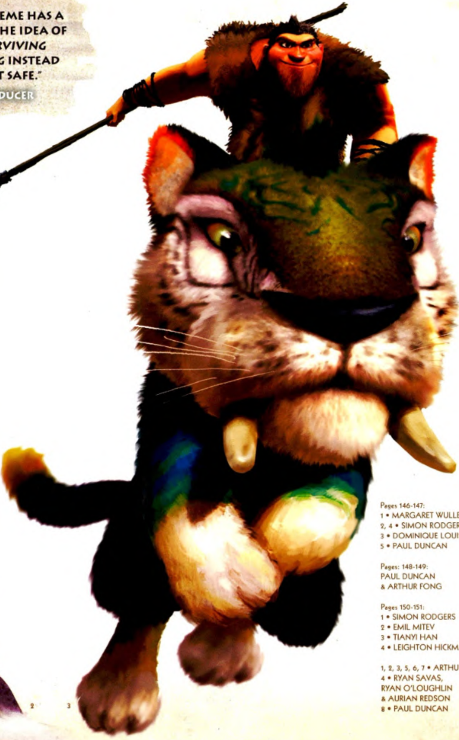

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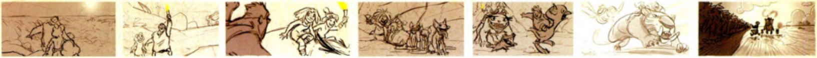
Pages 146-147:
1 • MARGARET WULLER
2, 4 • SIMON RODGERS
3 • DOMINIQUE LOUIS
5 • PAUL DUNCAN

Pages: 148-149:
PAUL DUNCAN
& ARTHUR FONG

Pages 150-151:
1 • SIMON RODGERS
2 • EMIL MITEV
3 • TIANYI HAN
4 • LEIGHTON HICKMAN

1, 2, 3, 5, 6, 7 • ARTHUR FONG
4 • RYAN SAVAS,
RYAN O'LOUGHLIN
& AURIAN REDSON
8 • PAUL DUNCAN



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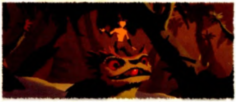

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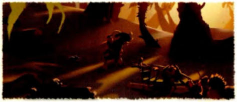

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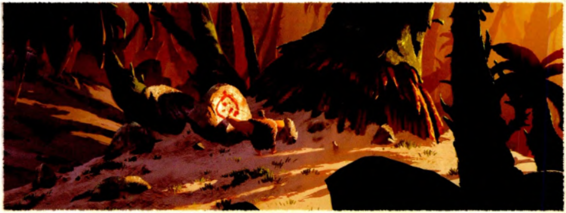
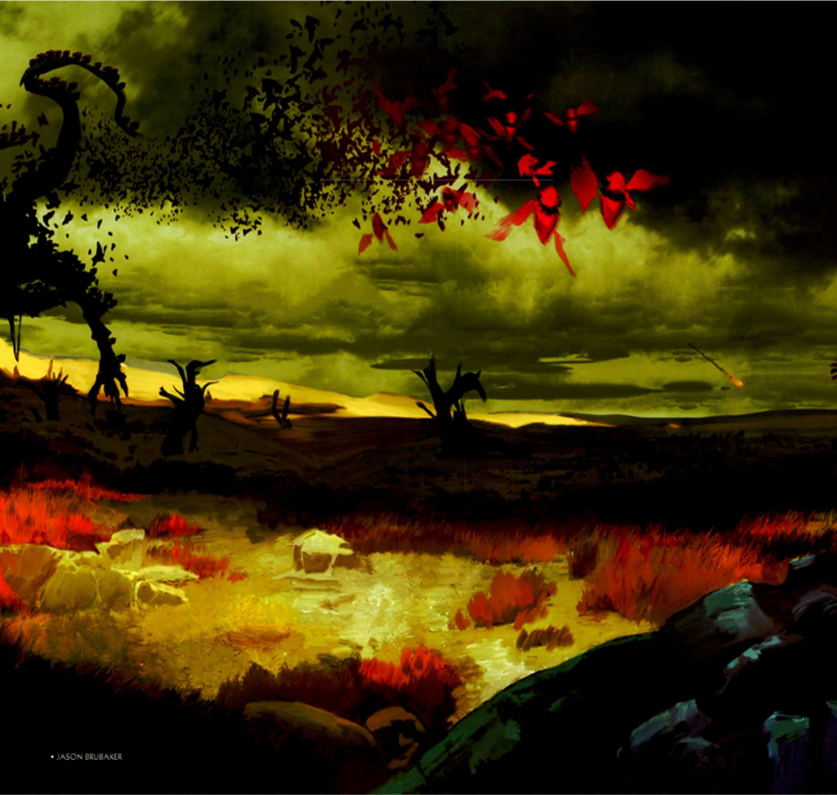
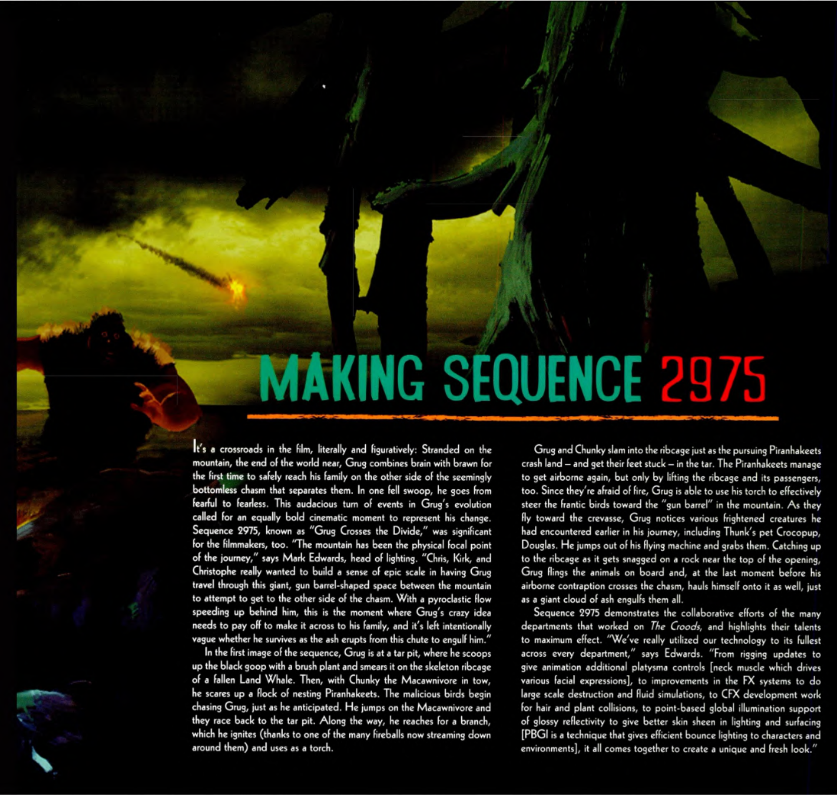


8

ANATOMY OF A SCENE



• JASON BRUBAKER



MAKING SEQUENCE 2975

It's a crossroads in the film, literally and figuratively: Stranded on the mountain, the end of the world near, Grug combines brain with brawn for the first time to safely reach his family on the other side of the seemingly bottomless chasm that separates them. In one fell swoop, he goes from fearful to fearless. This audacious turn of events in Grug's evolution called for an equally bold cinematic moment to represent his change. Sequence 2975, known as "Grug Crosses the Divide," was significant for the filmmakers, too. "The mountain has been the physical focal point of the journey," says Mark Edwards, head of lighting. "Chris, Kirk, and Christophe really wanted to build a sense of epic scale in having Grug travel through this giant, gun barrel-shaped space between the mountain to attempt to get to the other side of the chasm. With a pyroclastic flow speeding up behind him, this is the moment where Grug's crazy idea needs to pay off to make it across to his family, and it's left intentionally vague whether he survives as the ash erupts from this chute to engulf him."

In the first image of the sequence, Grug is at a tar pit, where he scoops up the black goop with a brush plant and smears it on the skeleton ribcage of a fallen Land Whale. Then, with Chunky the Macawnivore in tow, he scares up a flock of nesting Piranhakeets. The malicious birds begin chasing Grug, just as he anticipated. He jumps on the Macawnivore and they race back to the tar pit. Along the way, he reaches for a branch, which he ignites (thanks to one of the many fireballs now streaming down around them) and uses as a torch.

Grug and Chunky slam into the ribcage just as the pursuing Piranhakeets crash land – and get their feet stuck – in the tar. The Piranhakeets manage to get airborne again, but only by lifting the ribcage and its passengers, too. Since they're afraid of fire, Grug is able to use his torch to effectively steer the frantic birds toward the "gun barrel" in the mountain. As they fly toward the crevasse, Grug notices various frightened creatures he had encountered earlier in his journey, including Thunk's pet Crocopup, Douglas. He jumps out of his flying machine and grabs them. Catching up to the ribcage as it gets snagged on a rock near the top of the opening, Grug flings the animals on board and, at the last moment before his airborne contraption crosses the chasm, hauls himself onto it as well, just as a giant cloud of ash engulfs them all.

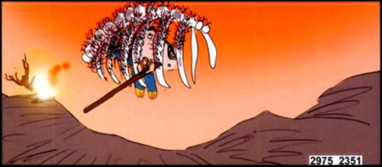
Sequence 2975 demonstrates the collaborative efforts of the many departments that worked on *The Croods*, and highlights their talents to maximum effect. "We've really utilized our technology to its fullest across every department," says Edwards. "From rigging updates to give animation additional platysma controls [neck muscle which drives various facial expressions], to improvements in the FX systems to do large scale destruction and fluid simulations, to CFX development work for hair and plant collisions, to point-based global illumination support of glossy reflectivity to give better skin sheen in lighting and surfacing [PBGI is a technique that gives efficient bounce lighting to characters and environments], it all comes together to create a unique and fresh look."

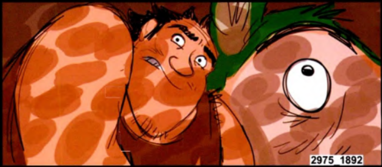
STORY AND LAYOUT

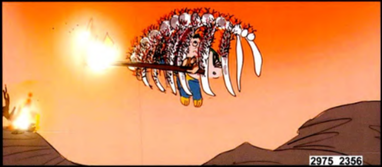
Story artists take the pages of a written script and transform them, with guidance from the directors, into visual storyboards that illustrate the key actions of every scene. In developing the details of Sequence 2975, directors Chris Sanders and Kirk DeMicco turned to veteran story artist Simon Wells, an expert in action scenes and a great problem solver. "They said, 'Grug has to figure out how to get over this HUGE chasm. We don't know how he's going to do it. Oh, and we want Grug to team up with the Macawnivore, too. What have you got?'" Wells recalls. "I figured it was time for Grug, who has failed to have any good ideas up until now, to come up with the biggest and best idea of them all: To fly. So I dug back through earlier events in the movie and combined the tar-pit trap with Guy's fire and the terrifying Piranhakeets to create an airborne contraption that could carry Grug and his new pet across the divide." The idea flew with Sanders and DeMicco.

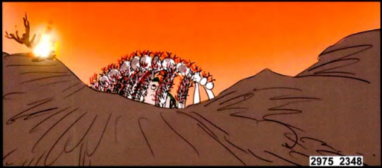
Once the directors approved the storyboard progressions, the rough layout artists took the reins. They, in turn, translated the storyboard panels into actual shots in 3D space by putting cameras into the set, loosely animating the characters and effects, and shooting rudimentary coverage of each angle to hand off to editorial. This was no easy task, according to Yong Duk Jhun, head of layout: "This epic action sequence took nearly an entire rough layout team about eight weeks to previsualize. It wasn't only due to the length of the sequence but also because the story moments we could explore were so vast in comparison to the storyboards we were provided with," he says. "Rough layout artists had to previsualize three times the amount of shots that actually made it into the movie in order to achieve the best possible angle for each action piece."

The final layout artists then created a master shot of the scene by replacing simplified versions of Grug, the Macawnivore, and the animals with high-resolution models. "The master shot is the backbone for a sequence that other proceeding departments will copy from, add to, and use for their departments' contributions," explains Valerie Lettera-Spletzer, head of final layout. Separately, final layout worked with animation to create a template of various elements of the scene that needed to be attached to one another, such as Grug holding his torch, the tar on the ribcage, and the Macawnivore in the ribcage. Final layout also dressed the set with rocks, shrubs, and trees. "The goal is to find one position where all the objects look good when seen through the sequence's different shot cameras," Lettera-Spletzer says.

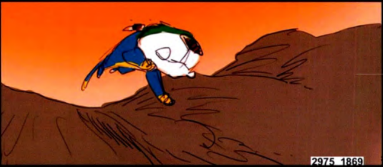


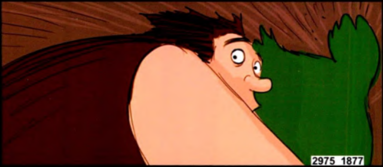


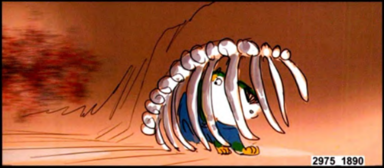


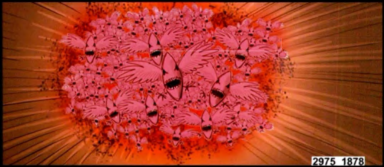


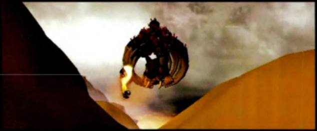
Story: SIMON WELLS
Layout Credits: • MICHAEL COMFORT (rough layout) • LORENZO BAMBINO (layout animation prep) • PHILIPPE BROCHU (modeling) • AMY CHEN (layout set dressing) • YONG DUK JHUN (final camera)



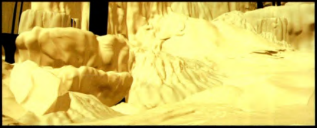




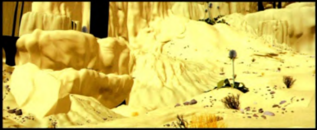




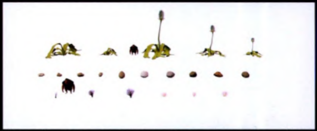
Rough layout version of the scene to visualize the action, composition, and camera moves



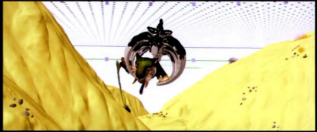
Tar pit environment prior to set dressing pass



Final layout set dressing pass for additional environment assets



Final layout lineup of all the tar pit set dressing assets with Grug positioned for scale



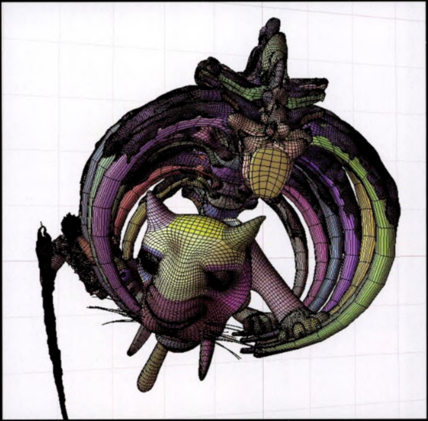
Final layout preview render with all elements in scene post set dressing

MODELING AND SURFACING

The modeling department built the digital world of *The Croods*, crafting the characters and environments as 3D sculptures within the computer. In this sequence, it crafted the organic network of pools and mounds of the tar pit landscape. "We sculpted channels and drips to suggest the oozing and bubbling liquid that has hardened over centuries," says head of modeling Jeff Hayes. The surfacing department – which defines the material properties, color, and texture of each individual object, whether it reflects, absorbs, or emits light, is shiny or matte, smooth or coarse, has a skin material or fur – continued their work.

Surfacing also handles the complexities of how light realistically scatters through skin (subsurface scattering), and adds additional detail to create texture. "The surfaced environment in 2975 had to have a feeling that the world around Grug and the Macawnivore was hostile and bleak," says head of surfacing Sabrina Riegel. "The tar pits have an acidic-yellow earth with pools of molten tar and the tundra ground is ashen with dead grass and weathered, bark-stripped trees."

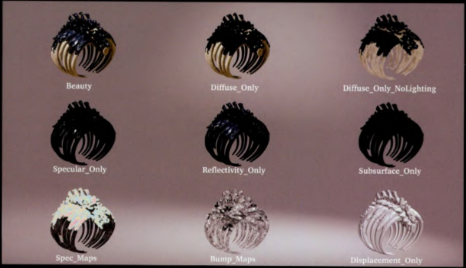
Modeling Credits:
- ABRAHAM MENEU OSET (Macawnivore model)
- JEFF HAYES (Grug model)
- PHILIPPE BROCHU (ribcage model, tar pits model)
- PHIL ZUCCO (Piranhakeet model)



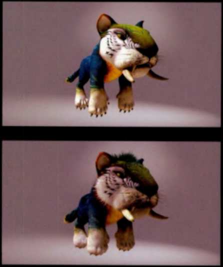
The geometry mesh and subdivision surfaces colored by part

Modeling preview Maya render of the tar pits environment

Surfacing Credits: • RONNIE CLELAND (tar pit environment surfacing) • SABRINA RIEGEL (surfacing) • TOMIJANN NABORS (surfacing)

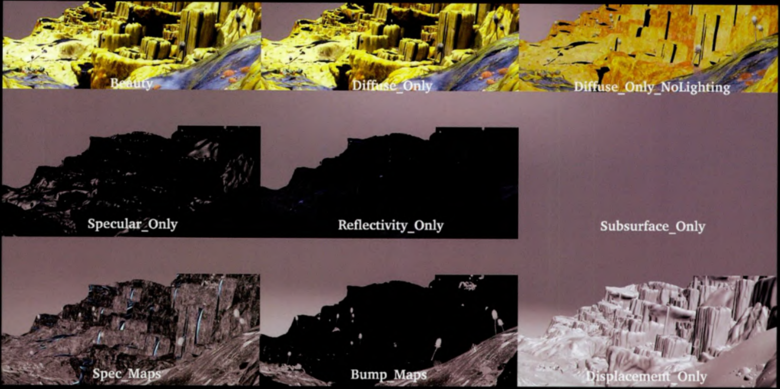

Beauty
Diffuse_Only
Diffuse_Only_NoLighting
Specular_Only
Reflectivity_Only
Subsurface_Only
Spec_Maps
Bump_Maps
Displacement_Only

Surfacing diagnostic render of the ribcage with tar asset showing the various material and map components



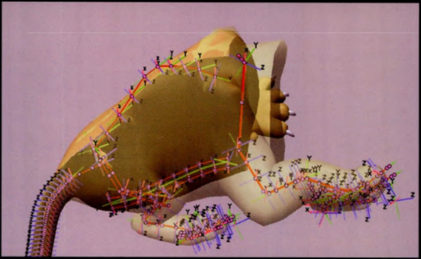
The final Macawnivore after the fur groom is added by surfacing

Surfacing diagnostic render of the tar pits showing the various material and map components


Beauty
Diffuse_Only
Diffuse_Only_NoLighting
Specular_Only
Reflectivity_Only
Subsurface_Only
Spec_Maps
Bump_Maps
Displacement_Only

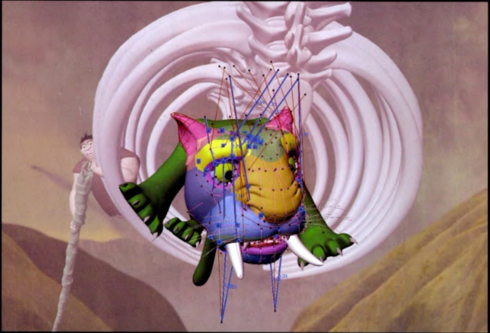
CHARACTER TD AND ANIMATION

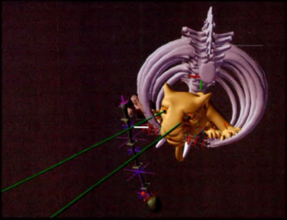
The character technical direction department (also known as rigging) adds controls to digital models so that animators can move them. Generally there are distinct rig controls for characters' bodies, heads, and additional animated props. It's important to maintain muscle volume and definition as a character moves to make them feel physical. On *The Croods*, additional work was done to add more muscle tone and tendon lines for tangibility. For Sequence 2975 specifically, the animators wanted very precise facial expressions for the Macawnivore. Crucial wrinkles across Chunky's nose and around his mouth, patterned on images of real tigers, achieved the desired movement and attitude. For their part, animation played with the fact that the cat can be "terrifying at times, but also terrified," notes head of animation James Baxter. As a whole, "This sequence gave us the chance to do some really fun, crazy animation, but it was also very challenging," he adds. "There's a lot of technical considerations when you've got so many creatures all piled up together, and flying, no less!"



Various layers of the Macawnivore body rig

Various layers and controls for the Macawnivore face rig



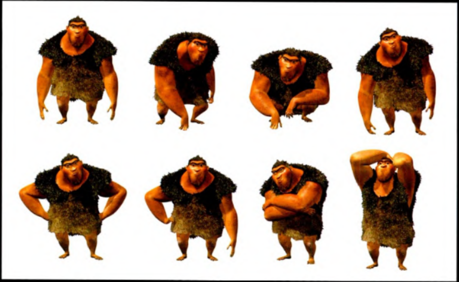


Shows what the animator sees in EMO, with a number of animation icons turned on

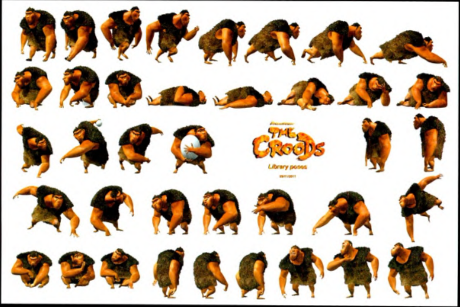
Character TD Credits:
- MARIETTE MARINUS (Grug face rig)
- SVEN POHLE (Grug body rig)
- KOJI MORIHIRO (Macawnivore face rig)
- YUKINORI INAGAKI (Macawnivore body rig)
- VALENTINA ERCOLANI (tar brush and ribcage rigs)

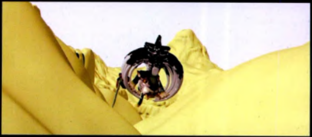
Animation Credits:

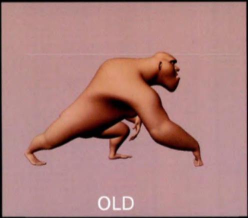
- RAFAELLA FILIPPONI (animation)
- KOJI MORIHIRÓ (Macawnivore face rig)
- YUKINORI INAGAKI (Macawnivore body rig)
- KRISTOF SERRAND (Grug face rig)
- MARIETTE MARINUS (Grug face rig)
- SVEN POHLE (Grug body rig)
- VALENTINA ERCOLANI (tar brush and ribcage rigs)
- JAKOB JENSEN (animation)
- GABRIELE PENNACCHIOLI (animation)

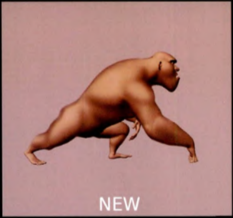


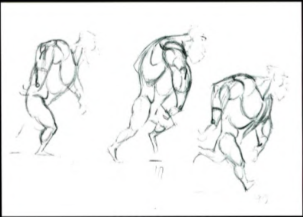
Various character poses for Grug

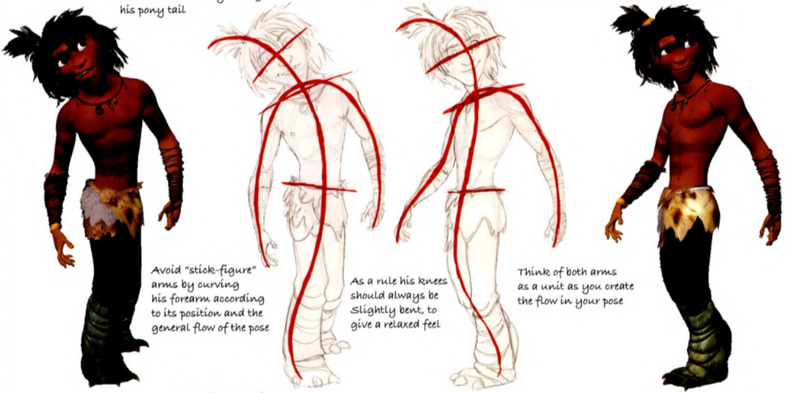












Make sure the line of action makes it all the way through his pony tail

Tilt his head generously

Always think in terms of Rhythm, Asymmetry & Flow!

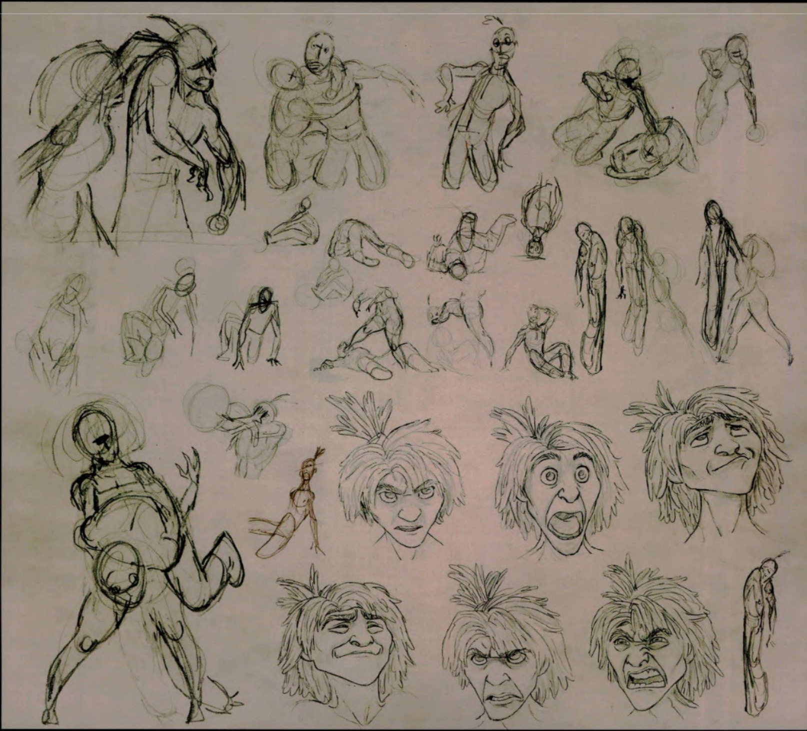
Avoid "stick-figure" arms by curving his forearm according to its position and the general flow of the pose

As a rule his knees should always be slightly bent, to give a relaxed feel

Think of both arms as a unit as you create the flow in your pose

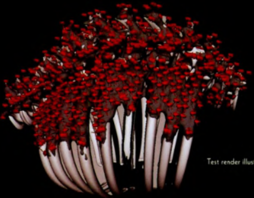
Emphasize the weight by curving the shins out

Animation Credits: GABRIELE PENNACCHIOLI & JAKOB JENSEN

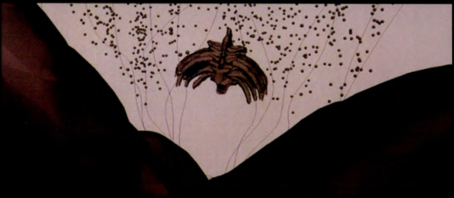


CROWDS

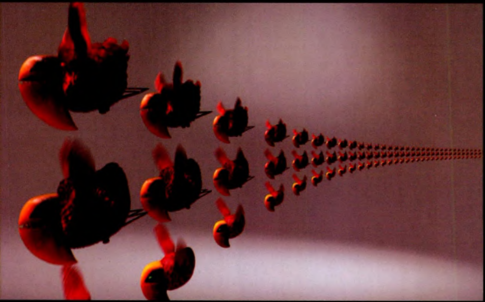
Ironically, for *The Croods,* the production had a crowd team of one – crowds supervisor Spencer Knapp! But his work to hurtle swarms of dangerous Piranhakeets at the family was critical to the story, and a pivotal piece of inventiveness for getting Grug across the chasm in Sequence 2975. While animation typically handles all main character motion, when the story calls for massive amounts of characters or creatures within a scene, it's impossible to hand animate them all efficiently. That's when the crowds department takes over. A crowd cycle animator helps create small pieces of animation – a repeatable walk, run, or flying cycle. In the case of *The Croods,* the Piranhakeets follow intricate 3D space curves, like a rollercoaster. When Grug startles the birds into the sky in Sequence 2975, depriving them of their usual sundown flocking ritual, they go into what Knapp calls their "tornado behavior," which culminates in their "attack strand behavior." "There are far more birds in the attack strands than could ever fit on the ribcage," Knapp says. "In order to make this feel more believable, we needed to create an element of birds that scatter after the attack. The timing of this was delayed to allow for a dramatic reveal of Grug's flying machine." Actual flight footage from massive flocks of swallows helped guide the look of the crowds, giving them a unique but realistic swarming quality.

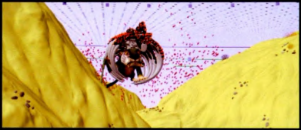


Test render illustrating the Piranhakeets stuck to the tar of the ribcage



Work in progress for crowd simulation with Piranhakeets represented as spheres for preview



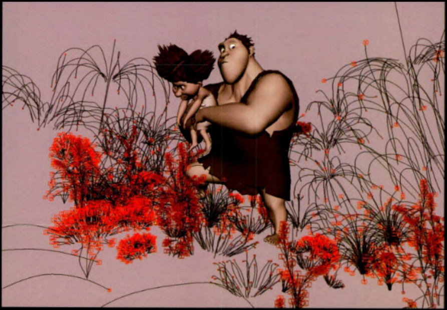


Preview frame of crowd render through shot camera

Crowds Credits:

- SPENCER KNAPP (crowds and department supervisor)
- LIRON TOPAZ (crowd cycle animation)
- HYUN KIM (Piranhakeet face rig)
- KENDAL SAGER (Piranhakeet body rig)
- TERRAN BOYLAN (Piranhakeet crowd rig)
- PHIL ZUCCO (modeling)
- SABRINA RIEGEL (surfacing)

Example of added wind for the fur on the Macawnivore



CFX plant interaction with characters

Animated frame sequence showing wind through Grug's coat fur

CFX Credits:
- KEMER STEVENSON (CFX artist)
- CHRIS DE ST. JEOR (Grug dynamic hair CFX setup, offset rig CFX setup)
- MICHAEL JUAREZ (Grug dynamic hair CFX setup, Grug coat wind CFX setup)
- JOHN T. LEE (Grug coat wind CFX setup)
- DAVID FEDELE (Houdini CFX support)
- CHRIS DE ST. JEOR, MARCUS ERBAR & CHRIS MICHAEL (dynamic plant rigs set up)

CHARACTER EFFECTS

The character effects team handles all of the realistic clothing simulations, fur dynamics, wind motion, and tar and foliage interaction that place the characters into a tangible world. CFX tunes all of the characters' hair and outfits to react the way the directors expect. Fur, such as the Macawnivore's mane, needs to sway realistically with every step. To create wind effects, they utilized a few different techniques: For wind on humans, CFX deformed guide hairs on the characters' heads and used noise maps at render time, which created wind on their outfits. In Sequence 2975, CFX was responsible for the wind hitting all the characters in the ribcage as well as fur-to-fur contact between the animals and Grug. "As the panic builds in this sequence," says CFX supervisor Damon Crowe, "we switch the direction of the wind to come from the approaching FX destruction."

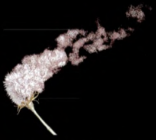
VISUAL EFFECTS

The FX department handles things like fire, water, smoke, foreground clouds, rain, dust, explosions, and drifting fog – on top of the destruction work they are well known for. In "Grug Crosses the Divide," they were responsible for creating the pyroclastic flow and also Grug's torch fire. "The fire effect serves as a rudder that helps Grug guide his flying ribcage across the divide. We wanted the fire to be big enough to create large plumes that break off as he traverses the mountain," says head of FX Matt Baer. "The fire was created using a 3D gas solver written by our DreamWorks R&D department. The solver simulates the way fluid moves on the computer and works very similarly to fire in the real world – the artist creates a mixture of fuel and heat to produce the desired amount of fire and smoke." Starting from the animated characters and props, artists selected portions of the geometry that would emit fire into the solver. In addition to fuel and temperature, FX artists incorporated wind and turbulence forces to help art direct the motion and shape of the flames. Embers and ash were emitted from the fire to add more detail to the effect.

FX department fire reference

William Opdyke (photo)

On *The Croods*, the fire became a very important aspect of the lighting workflow. In every scene, the fire simulation would serve as a PBGI light source for the characters and environments. FX artists would bake all of the fire simulation's color and light intensity into a sequence of particle files. "While we've used this PBGI technique on previous films, we had a lot to learn in terms of handing off consistent particle intensities to lighting," says Baer. "It's very easy for the temperature and brightness of a flame to vary from shot to shot." Before handing off these light sources, FX artists would validate that their data was balanced to reduce the light intensity variance from shot to shot. The addition of PBGI and moving to a high dynamic range compositing allowed the team to improve the way their fire integrated into the lighting environment.



Particles emitted for lighting to use in their point-based global illumination setups

Raw render of the fire element before additional compositing work

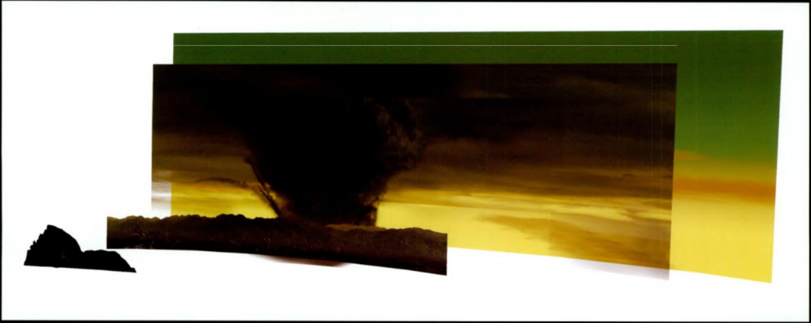
Raw smoke simulation element before additional compositing work

Visual FX Credits:
- YOUXI WOO (FX artist)
- MATT HEAD (FX developer)
- RON HENDERSON (fluid solver developer)

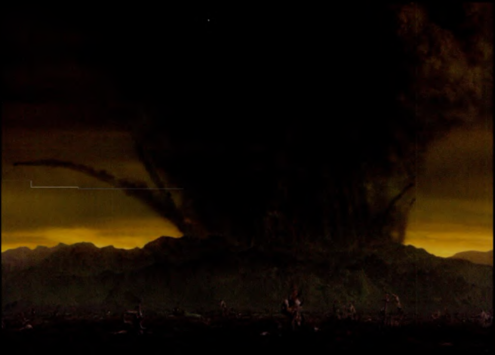
Fire element after compositing treatment over a black background

Final fire element composited within the scene

FX department collecting real fire footage for reference
Greg Wuller (pictured), Shinsaku Arima (photo)



Matte painting elements arranged in 3D space showing the layering

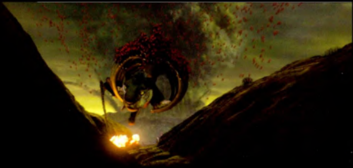


Final matte painting composite with animated smoke plume and fireballs

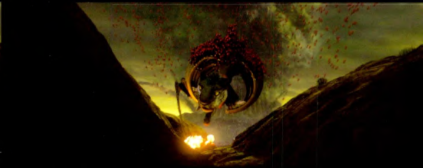
MATTE PAINTING

Certain portions in the *Croods* backgrounds – such as skies, clouds, and distant horizon features – fall into the territory of matte painting, which extends the environment that has been surfaced and lit to the horizon, giving it scope and vastness. Utilizing a variety of 3D and 2D projection techniques, matte painters are able to seamlessly integrate their art, even in stereo 3D. "The biggest challenge for us in this sequence was giving the illusion of mass and scale to the pyroclastic cloud matte painter Mark Nonnenmacher had painted," says matte painting supervisor Scott Brisbane. Working in layers to more easily make adjustments based on art direction, Brisbane's team used image-warping and stretching techniques to animate the rising pyroclastic plume and give it life, along with additional fireballs and smoke trails animated on projection cards placed in 3D space.

Matte Painting Credits:
- SCOTT BRISBANE (matte painting supervisor)
- MARK NONNENMACHER (matte painter/pyro animation)
- PAUL RIVERA (matte painting compositor)



al lighting frame rendered from the left eye stereo camera

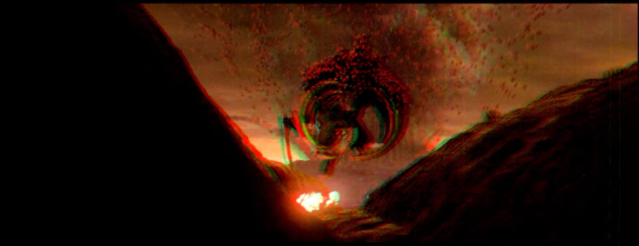


Final lighting frame rendered from the right eye stereo camera

STEREO 3D

Stereo is the rendering of an image from two distinct points of view to create a three-dimensional frame. These are typically distinguished as the "left" and "right" eye images. Each image needs to be projected from slightly offset cameras to form the stereo image. Just as camera style and lighting can influence the feel of a sequence, so too can the stereo 3D settings. Effectively adjusting the intensity of stereo can increase the dramatic tension across a series of shots or boost the effect of action shots. Likewise, the sense of intimacy offered by stereo 3D immersion can help create more powerful emotional character moments.

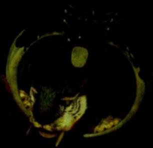
The final 3D stereo camera pass is created in final layout and then projected onto a large movie screen for approval. "*The Croods* has some of the strongest 3D that DreamWorks has produced to date and we wanted to keep this depth even during the action sequences, which can be very challenging," says stereoscopic supervisor Phil 'Captain 3D' McNally. "Lighting and camera work is essential for directing the viewer's eye in the scene so that we can maintain the fully immersive depth throughout. The strong depth can then add to the danger and drama of the sequence."



Final lighting frame displayed as a stereo 3D color anaglyph

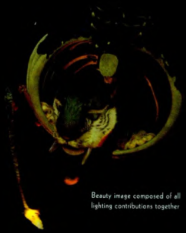
Stereo 3D Credits:
- CHRISTOPHER ELL (stereoscopic compositor)

Lighting Credits:
- PAUL DUNCAN (visual development key)
- BERT POOLE (CG supervisor)
- JOHN LEE (lighting lead)



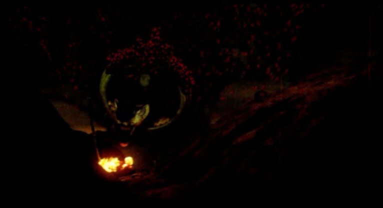
Sky and environment diffuse lighting contribution

Torch highlight lighting contribution

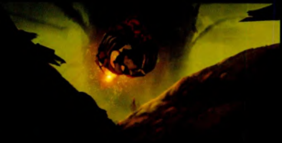


Beauty image composed of all lighting contributions together

Sky and environment highlight lighting contribution



Final lit frame



Visual development art key illustrating the lighting scenario used for reference

LIGHTING

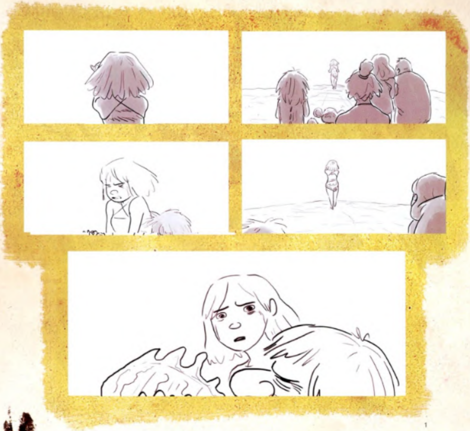
Lighting artists gather all the various assets to be lit, rendered, and composited together for the final image of the film. They help shape, color, reveal, or hide elements, all to set the mood, tone, and focus of each scene. They work much like a live-action cinematographer would in placing the various light sources (or blocking them) to best fit the action and story points for a scene. On *The Croods*, the development of PBGI glossy reflectivity allowed for the use of broad area lights for very soft lighting on the characters while retaining the necessary skin sheen that is vital to having a believable-looking character. For the torch fire in this sequence, FX handed off data for the flame to be used in lighting to have accurate illumination from such a dynamic source. "It was critical to build up the drama and tension as Grug heads through the gun barrel with the pyroclastic flow approaching behind him," says head of lighting Mark Edwards. "A darker, grittier look was achieved using the torchlight as an accent, heading from a mostly greenish tinged soft sky feel to a red-orange underlit dramatic tone as he reaches the chasm."

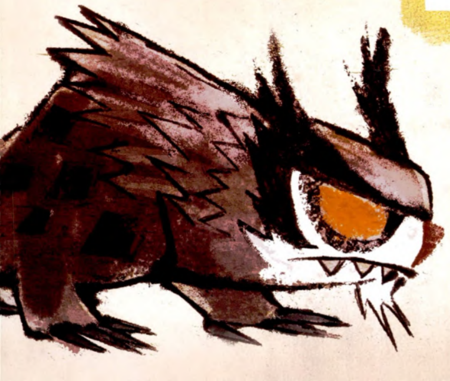
CONCLUSION

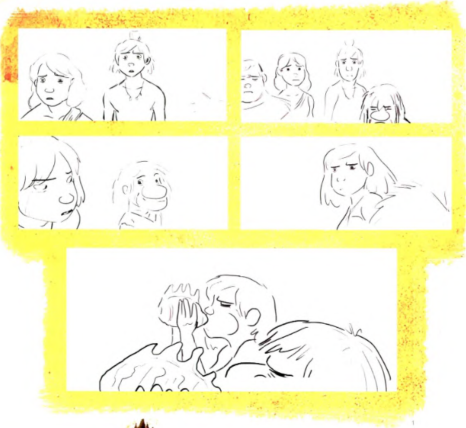
In setting out to create the topsy-turvy epoch of the Croodaceous, the *Croods* team has succeeded, even beyond their own lofty expectations, in challenging imaginations, entertaining minds, and capturing hearts. It's a testament to their creativity and the cooperative nature of what they do.

"The animation filmmaking process is such a collaborative medium. The most interesting result comes from this collective pursuit of excellence," says VFX supervisor Markus Manninen. "It's the belief that something great is out there just beyond your reach and the willingness to make the extra effort in getting there. You don't know what you're going to get until you get there. If it were already a known entity, we wouldn't be doing it. It wouldn't be interesting."

Many themes run through *The Croods*: Those of light, bravery, taking chances. Perhaps the most resonant idea is the importance of family. The Croods are survivors. They have made it through a time of earth-shattering change – together. "The takeaway I would love people to have from *The Croods* is this: Your whole world can evolve to an unrecognizable point, but the thing that is constant is the bond between family," says producer Kristine Belson. "That will never change."







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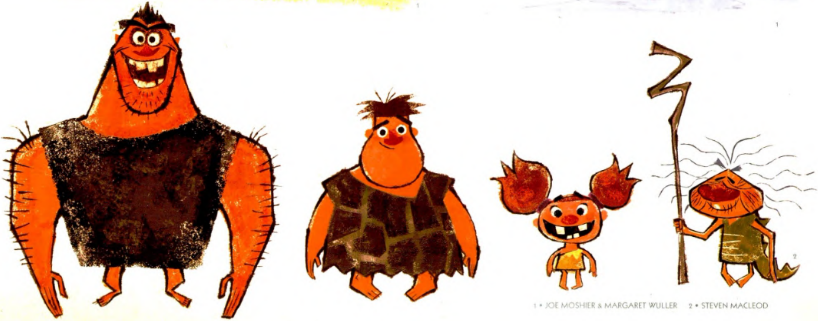

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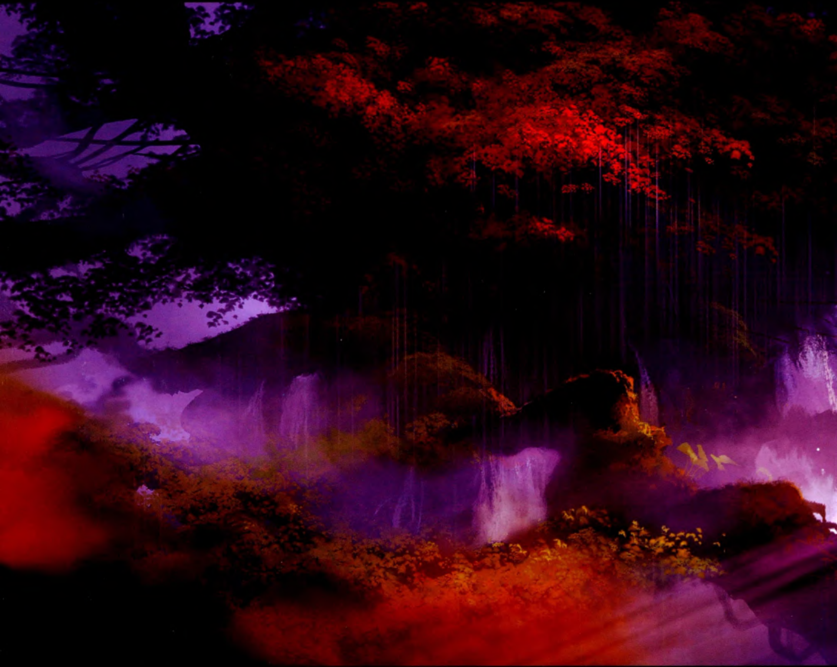
1 • JOE MOSHIER & MARGARET WULLER   2 • STEVEN MACLEOD



Layout / Color • DOMINIQUE LOUIS

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Thanks to Kristy Cox, whose support and expertise were invaluable, and to Karen Hoffman.

Thanks also to Lauren Malizia and Daniel Chun, who helped negotiate scores of questions via e-mail.

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To my wonderful family – my husband Ruben and our two amazing daughters Alegra and Aria – thank you. You were gracious and patient with me as I delved into the breathtaking world of *The Croods* to the exclusion of nearly all else. I love you very much.

– N. H.

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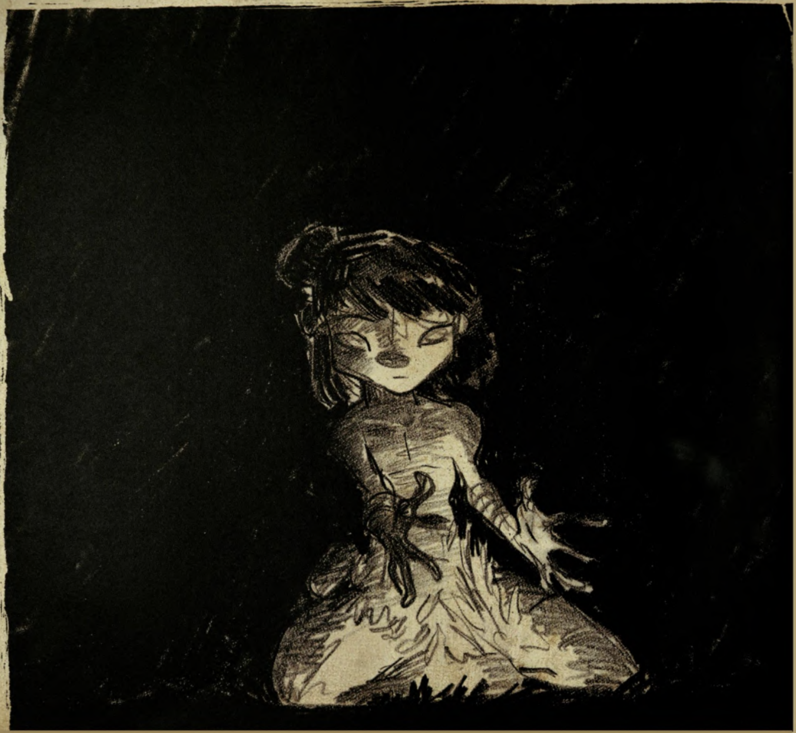
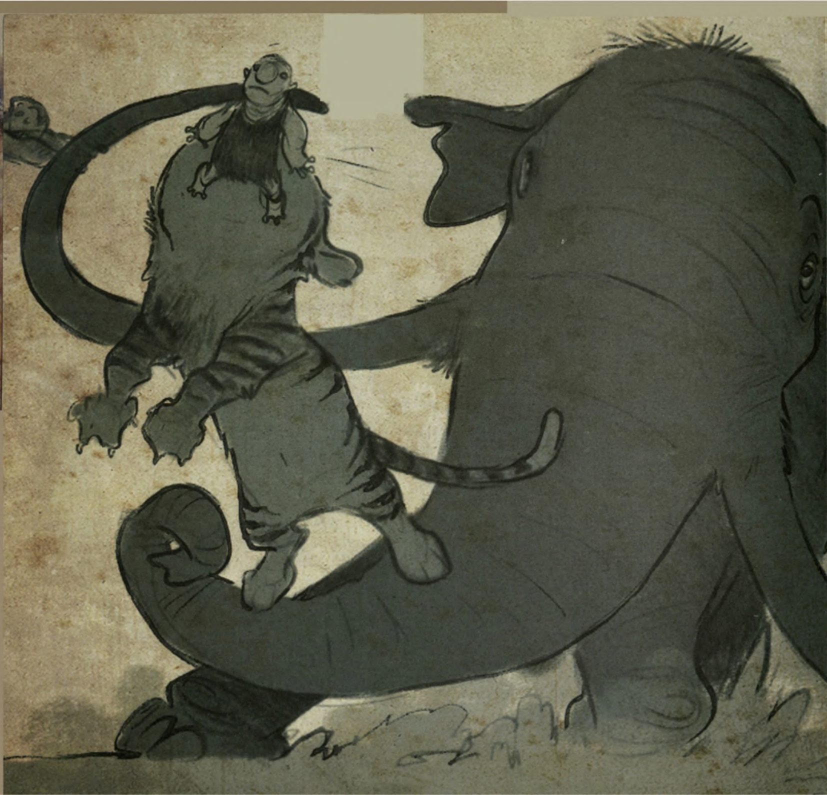
Back Endpaper Inside and Outside: CHRIS SANDERS





ABOUT THE AUTHOR

Noela Hueso has been an ardent fan of animation for many years, both on a personal level and as a former editor at *The Hollywood Reporter*, where animation was among the beats she covered. A UCLA graduate, Noela lives in Pasadena, California with her husband and two daughters. This is her first book.

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